

SCIENCE

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FRIDAY, JANUARY 26, 1900.

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MSS. intended for publication and books, etc., intended for review should be sent to the responsible editor, Professor, J. McKeen Cattell, Garrison-on-Hudson, N. Y.

THE INTERNATIONAL ASSOCIATION OF SCIENTIFIC SOCIETIES.

WE are able to publish through the courtesy of the President of the National Academy of Sciences, Dr. Wolcott Gibbs, the correspondence arranging for the conference of Scientific Societies held at Wiesbaden on the 9th and 10th of October, 1899. We hope to be able to publish later through the courtesy of Professor H. P. Bowditch, delegate from the National Academy of Sciences, an account of the Conference based on the official proceedings. It is scarcely necessary to call attention to the great importance of the plans of the Conference for the advancement of science and for the good understanding between nations to which the advancement of science is largely contributing.

THE ROYAL SOCIETY, BURLINGTON HOUSE,
LONDON, W., April 14, 1899.

SIR: The Royal Society has frequently had occasion to take action in respect to scientific undertakings calling for the coöperation of several countries, and undertakings of this nature show a tendency to increase. The experience of the Society has lead to the belief that it would be very advantageous to the interests of science generally if some machinery could be devised, by means of which suggestions made for international coöperation in scientific enquiries could be thoroughly discussed by the leading men of science from a purely scientific point of view, before definite proposals are made with a view to official action by the Governments of the countries concerned.

With this view, the Royal Society has communicated with the leading scientific Academies of Europe, whose replies give much encouragement to the idea that it may be possible to establish an organization, under which formal and regular meetings of representatives of all leading scientific Academies may be held for the purpose of discussing scientific matters calling for international coöperation, and by this means preparing the way for international action. The Council of the Royal Society regard this question as one of great importance, and I am to request you to bring it before your Academy, and to ask whether that body would be prepared to join such an organization if established, and to coöperate in arranging the details for inaugurating it upon a practical working basis.

I have the honor to be

Very faithfully yours,

(Signed)

LISTER,
President, R. S.

THE PRESIDENT OF THE NATIONAL ACADEMY OF
SCIENCES, WASHINGTON, D. C., U. S. A.

THE NATIONAL ACADEMY OF SCIENCES,
WASHINGTON, May 12, 1899.

SIR: I have the honor to acknowledge the receipt of your communication of April the 14th last asking me to bring before the National Academy of Sciences a plan to establish an organization under which formal and regular meetings of representatives of all leading scientific academies may be held for the purpose of discussing scientific matters calling for international coöperation and by this means preparing the way for international action.

There is no meeting of the National Academy of Sciences until the 14th of November next, but I will lay the matter at once before the Council of the Academy for consideration.

I cannot doubt that the subject will receive its warm approval and that the Academy, on the recommendation of the Council, will accept and cordially join in carrying out the plan proposed. I have the honor to be

Your obedient servant,

(Signed)

WOLCOTT GIBBS,
President of the National Academy of Sciences.
THE PRESIDENT OF THE ROYAL SOCIETY,
LONDON, ENGLAND.

THE ROYAL SOCIETY,
BURLINGTON HOUSE, LONDON, W.,

May 31, 1899.

Sir: On the 17th November of last year the President of the Royal Society addressed a letter to the Academie des Sciences of Paris, the Reale Accademia dei Lincei of Rome, and the Academie Imperiale des Sciences of St. Petersburg, in reference to a proposal that the leading Academies should meet at intervals to discuss matters which might demand international coöperation; and a similar letter was subsequently addressed to the National Academy of Sciences of Washington.

The letter was written in consequence of what had taken place at a meeting of German Academies at Göttingen in June of that year, at which representatives of the Royal Society were present; and we have communicated to a meeting of the same Academies which has just been held at Munich the favorable replies which we have received from each of the Academies whom we had addressed.

We have now the pleasure to inform you that the invitation to a meeting at Wiesbaden, on October 9 and 10, which this letter accompanies, is a step towards carrying out the proposal in question, and we sincerely hope that your Academy will be able to take part in the meeting, which is intended to be a preliminary one for the purpose of discussing the mode in which such an Association of Academies can be best organized.

We are, sir,

Your obedient servants,

(Signed)

M. FOSTER,
ARTHUR W. RÜCKER.
Secretaries, R. S.

THE PRESIDENT OF THE NATIONAL ACADEMY OF
SCIENCES, Washington, D. C., U. S. A.

KÖNIGLICHE AKADEMIE DER
WISSENSCHAFTEN.

BERLIN, den 13, Juni, 1899.

Die Königlich Preussische Akademie der Wissenschaften in Berlin beehrt sich im Verfolg ihres am 1. ds. Mts. abgesandten Einladungsschreibens zu einer Conferenz in Wiesbaden am 9 und 10 October ds. Js. behufs Grundung einer

internationalen Association gelehrter Gesellschaften anbei den von den Akademien in Berlin, Göttingen, Leipzig, München und Wien vorläufig vereinbarten Plan der Grundung ganz ergebenst zur Kenntniss zu bringen. Weitere Vorschläge über die Einzelheiten der Organization und Geschäftsführung, die als Vorlage zur Discussion auf der Wiesbaden Conferenz dienen sollen, wird unsere Akademie sich erlauben in kürzester Frist nachzusenden. Wir bitten aber uns schon jetzt mittheilen zu wollen, ob die National Academy in Washington principiell geneigt ist an jenen Conferenz durch Absendung von Vertretern sich zu betheiligen und uns Namen und Adresse derselben bald gefälligst zur Verfügung zu stellen.

DIELS,

Der vorsitzende Secretar.

AN DIE NATIONAL ACADEMY OF SCIENCES, WASHINGTON.

KÖNIGLICHE AKADEMIE DER
WISSENSCHAFTEN.

BERLIN, den 24, Juli, 1899.

Die Königliche Akademie der Wissenschaften, welche die Delegirten Ihrer Akademie am 9. und 10. October auf der Conferenz in Wiesbaden zu begrüßen hofft, übersendet anbei 'Vorschläge zur Organization und Geschäftsführung,' die als Unterlage der Verhandlung dienen können. Genauer über Versammlungsort und Stunde wird den Delegirten später direct mitgetheilt werden. Zu diesem Zweck ersucht die Akademie Namen und Adresse der Delegirten bis spätestens Ende September an das 'Bureau der Königlichen Akademie der Wissenschaften' Berlin N. W. Universitätsstrasse 8, gefälligst einsenden zu wollen.

Zum Schluss beehrt sich die Akademie mitzutheilen, das sie ihrerseits ihre Mitglieder die Herren Auwers, Virchow und Diels zur Conferenz delegirt hat.

DIELS,

Der vorsitzende Secretar der Königlich Preussischen Akademie der Wissenschaften.

AN DIE NATIONAL ACADEMY OF SCIENCES, WASHINGTON, D. C., U. S. A.

KÖNIGLICHE AKADEMIE DER
WISSENSCHAFTEN.

N. W. 7 Universitätsstrasse 8.

BERLIN, den Juni, 1899.

Die Königlich Preussische Akademie der

Wissenschaften in Berlin beehrt sich im Auftrage der am 23. Mai ds. Js. in München versammelten deutschen Akademien und in Einverständniss mit der Royal Society, deren Regleitschreiben beigelegt ist, die National Academy, Washington, zum Zwecke der Gründung einer internationalen Association gelehrter Gesellschaften auf den 9. und 10. October ds. Js. nach Wiesbaden zu einer constituirenden, Conferenz einzuladen.

Diese Einladung ergeht gleichzeitig an die Königlichen Gesellschaften der Wissenschaften zu Göttingen und Leipzig, Königliche Akademie der Wissenschaften in München, Académie des Sciences in Paris, Kaiserliche Akademie der Wissenschaften in St. Petersburg, Reale Accademia dei Lincei in Rom, National Academy in Washington, Kaiserliche Akademie der Wissenschaften in Wien.

Der Zweck der Association ist, wissenschaftliche Unternehmungen, welche von der Gesamtheit der vereinigten Körperschaften oder von einer Gruppe derselben oder von einer einzelnen derselben in Angriff genommen oder empfohlen werden, zu unterstützen und sich über Einrichtungen zur Erleichterung des wissenschaftlichen Verkehrs zu verständigen. Jeder einzelnen Körperschaft soll die Entschliessung über die Theilnahme sowie über Mittel und Wege von Fall zu Fall vorbehalten sein.

Es wird Aufgabe der Wiesbaden Conferenz, sein, Organization und Geschäftsordnung dieser Association zu berathen und über etwaige Aufnahme anderer gelehrter Gesellschaften Beschluss zu fassen. Ein genaueres Programm wird binnen kurzem den eingeladenen Akademien zugestellt werden.

Vorläufig wird aus den zunächst für die Wiesbaden Conferenz geltenden Bestimmungen mitgetheilt, dass jede Academie eine beliebige, nach ihrem Ermessen zu bestimmende Anzahl von Vertretern entsendet, die Abstimmungen jedoch nach Akademien stattfinden. Die Sprache der Verhandlungen ist frei. Die Protokolle werden deutsch, englisch und französisch geführt.

Es wird in Aussicht genommen auf diese constituirende Conferenz in Wiesbaden die erste Arbeitsconferenz der Association im Jahre 1900, und zwar in Paris, folgen zu lassen.

Nach Eingang der in Aussicht gestellten Bestimmungen und Vorschläge bitten wir eine Erklärung über die Beschickung der Wiesbaden Conferenz unter Mittheilung der Namen der Delegirten an unser oben angegebenes Bureau gelangen zu lassen.

DIELS,
Der vorsitzende Secretar.

PLAN FOR THE FOUNDATION OF AN INTERNATIONAL ASSOCIATION OF LEARNED SOCIETIES, SUBMITTED BY THE ACADEMIES AT BERLIN, GÖTTINGEN, LEIPZIG, MUNICH AND VIENNA.

1. The formation of an International Association of the larger learned Societies of the world is regarded as expedient and as likely to prove of service to the advancement of science.

2. The object of this Association is to support scientific enterprises undertaken or recommended by the united Societies in common, or by a group of the same, or by any individual Society, and, further, to make arrangements for facilitating international scientific intercourse. Each Society shall, as regards any particular undertaking, reserve to itself the right of deciding whether it will participate or not.

3. At the conference to be held at Wiesbaden the organization of the Association and its business details will be more fully discussed, deciding at the same time, whether periodical meetings say every three or five years, shall be held, or whether such meetings shall take place at irregular intervals, as occasion requires.

4. The resolutions of the Wiesbaden Conference will be submitted to the individual Societies for their approval and sanction. The Societies will then, by the end of the year 1899, definitely inform some central authority appointed by the Conference, whether they intend or not to join.

5. Each Society is free to withdraw from the Association at any time.

6. The Royal Academy of Sciences (Berlin), in conjunction with the Royal Society (London), has invited the following bodies (here arranged in alphabetical order) to attend the Wiesbaden Conference:

1. Königliche Gesellschaft der Wissenschaften at Göttingen.

2. Königliche Gesellschaft der Wissenschaften at Leipsic.

3. Königliche Akademie der Wissenschaften at Munich.

4. Académie des Sciences at Paris.

5. Académie Impériale des Sciences at St. Petersburg.

6. Reale Accademia dei Lincei at Rome.

7. Kaiserliche Akademie der Wissenschaften at Vienna.

8. National Academy at Washington.

7. The question of the eventual admission of other Societies will be discussed at the Wiesbaden meeting.

8. Each body will exercise its own judgment concerning the number of representatives to be sent to Wiesbaden. At the voting the representatives of each Society will have but a joint vote.

9. The language to be used at the Conference will be optional: the minutes will be drawn up in English, French and German.

10. The Royal Society proposes that the first official meeting of the Association be held in the year 1900, in Paris.

All communications referring to the Wiesbaden Conference are to be directed to the 'Bureau der Königlichen Akademie der Wissenschaften,' Berlin, N. W., Universitätsstrasse 8.

PLAN FOR THE ORGANIZATION OF AN INTERNATIONAL SCIENTIFIC ASSOCIATION PRESENTED BY SIR MICHAEL FOSTER AND DR. H. P. BOWDITCH.

1. The members of the National Academies mentioned in the 'plan for the foundation of an international association of learned societies' (Berlin, June, 1899), together with those of such other Academies as may be chosen by a majority vote of the Academies represented at the preliminary conference in Wiesbaden in October, 1899, shall constitute an International Scientific Association.

2. The first meeting of the Association shall be held in Paris in 1900, and its subsequent meetings shall be held at such times and places as may be then or thereafter determined.

3. By a two-thirds vote of the Association, each Academy voting as a unit, representative Academies of other nations may be admitted to membership in the Association.

4. The objects of the Association are :

(a) To promote and make preliminary preparations for work requiring international coöperation for its prosecution.

(b) To facilitate intercourse, both professional and social, between scientific men of all countries.

5. The governing body of the Association shall be an International Council composed of one representative from each constituent Academy.

6. The Council shall hold its first meeting at such time and place as may be determined at the meeting of the Association in 1900, and shall make rules for its own organization and guidance, including the transaction of business by correspondence.

7. For the purpose of considering and framing recommendations concerning scientific enquiries calling for international coöperation special International Committees shall, upon recommendation of one or more constituent Academies, be instituted either at a general meeting of the Association, or when necessary during the intervals between such meetings, by the International Council.

8. Such International Committee shall consist of delegates appointed by the constituent Academies with special reference to their qualification to deal with the questions under consideration.

9. The first meeting of such a Committee shall be called by the President of the International Association or by the President of the Council, and at this meeting each committee shall adopt rules for its own guidance.

10. Each International Committee shall make a report embodying such recommendations as it may think advisable, to the President of the International Council who shall transmit the same to the constituent Academies.

11. The President of the Council shall, however, have power, if he see fit, before transmitting such reports to the constituent Academies, to submit the same to the Council, and this body shall have power to refer back the report to the committee for further consideration.

12. For the transaction of business, the President of the Council shall be authorized to employ a secretary whose compensation, as well

as other necessary office expenses, shall be provided for by contributions from the constituent Academies.

DELEGATES TO THE WIESBADEN CONFERENCE, OCTOBER 9 AND 10, 1899.

1. Königlich preussische Akademie der Wissenschaften, Berlin : Auwers Virchow, Diels.

2. Königliche Gesellschaft der Wissenschaften, Göttingen : Ehlers, Leo.

3. Königlich Sächsische Gesellschaft der Wissenschaften, Leipzig : Windisch, Wislicenus.

4. Royal Society, London : Sir M. Foster, Rücker, Armstrong, Schuster.

5. Königlich Bayerische Akademie der Wissenschaften, München : von Zittel, Bechmann, Dyck, von Sicherer.

6. Académie des Sciences, Paris : Darboux, Moissan.

7. Kaiserliche Akademie der Wissenschaften, St. Petersburg : Famintzine, Salemann.

8. National Academy of Sciences, Washington : Newcomb, Billings, Remsen, Bowditch, Bell.

9. Kaiserliche Akademie der Wissenschaften, Wien : von Hartel, Mussafia, von Lang, Lieben. Ersatzdelegirte : Gomperez, Toldt.

BLUE FOX TRAPPING ON THE PRIBILOF ISLANDS.

THE value of the Blue Fox, *Vulpes lagopus*, as a fur-bearing animal, has caused the establishment of various 'fox farms' or 'ranches,' not only on the islands of the northwest coast, and especially in the Aleutian chain, but even on some of the islands off the coast of Maine ; and it is naturally desirable to ascertain how these may be made to yield the best results. The problem of the 'fox farmer' is to obtain the greatest number of skins in a given season without so reducing the breeding animals as to lessen the catch for the succeeding year. Natural losses, due to starvation, may be prevented by feeding, but as foxes are naturally monogamous, it is evidently necessary to render them polygamous in order to render fox-raising a decided success, and this is the great desire of the trappers.

On the Pribilof Islands, in Bering Sea, the Blue Fox has been trapped continuously

for a long series of years, but not until recently has any attempt been made to study these animals with the view of not only systematically feeding and trapping them, but of endeavoring to effect such changes in their environment as would tend to make them polygamous. This attempt has been made by Mr. James Judge, who has for several years been Treasury Agent on the island of St. George, who has taken much interest in the fur seal and fox question, and to whom the information contained in this article is entirely due. From its isolation, its hilly, rocky character, and from the vast numbers of birds which resort to it for a breeding place, this island is admirably suited for the abode of the fox, the great drawback being the lack of food during the winter. This lack of food not only acts directly on the foxes by starving them, but causes them to abandon the island and go out on the floe ice whenever this drifts down upon the island, as it often, or usually does in early spring. In summer the foxes feed upon birds and eggs and to some slight extent, upon dead seal pups and the placenta dropped from those recently born. The bodies of the seals on the killing grounds are eaten to some extent, but these bodies rapidly decay, and besides during the killing season the supply of other food is most abundant.

Since the advent of pelagic sealing the foxes have had an abundant, though brief, supply of food in the fall in the shape of the seal pups whose mothers have been taken at sea, and who have starved in consequence. In 1896 every starved pup was devoured by the foxes, so that no actual count of them could be made, but from an estimate made by comparison with the known facts on St. Paul Island, their number was probably considerably over 2000, while in previous years it was much greater. The foxes have fed to some extent on the Pribilof Lemming, *Lemmus nigripes*, and seem to have nearly

exterminated the little creature, since but one specimen was seen in 1896-97. In winter the foxes eat anything that comes to hand, extraordinary as it may seem, subsisting to a considerable extent on sea urchins, *Strongylocentrotus drobachiensis*, which are gathered at low tide. Considerable grass is found in their stomachs in winter and some worms, which they scratch up on the killing grounds, as well as with a few tunicates and an occasional fish bone; but it may be said that in winter the foxes lead a precarious existence. Some not very energetic attempts have been made to introduce the Cottontail Rabbit on St. Paul Island, and the Cottontail and Jack Rabbit elsewhere, but so far without success; the proposed introduction of the Spermophile, *Spermophilus empetra*, which is found at Unalaska, would probably succeed better.

On the Aleutian Islands dried salmon has been used for feeding the foxes in winter, and on St. George the experiment was also tried of using cracklings and linseed meal. This latter was evidently not to the foxes' taste, but it was found that by mixing the meal with seal oil it was eagerly devoured. In 1897 Mr. Judge decided to use the carcasses of the fur seals taken for skins, but as the catch on the Island of St. George has of late years become so small that the bulk of the meat is eaten by the inhabitants, a number of bodies were salted and brought over from the neighboring island of St. Paul. Mr. Judge tried the experiment of putting down fresh carcasses in silos, as well as of salting them, and this plan has, with one exception, been entirely successful. The exception was when some seventy foxes effected an entrance into one of the pits, where they feasted to such an extent before being discovered, that a few died. The salted bodies were freshened by protracted soaking before being fed to the foxes. As the trapping season drew near these carcasses were placed at night in the vicinity

of one of the sheds, near which it was proposed to set traps, and, starting with four bodies, the number was increased as found necessary, until no less than ten were consumed each night.

When all was ready trapping was begun, box traps being used, in order that the foxes taken might be examined to ascertain their sex, the dead falls formerly employed killing whatever entered, regardless of sex or condition. All females were turned loose after being marked by clipping a ring of fur from the tail, an exception being made when white foxes were caught, all of these being killed in the endeavor to produce a breed none of which should turn white in winter.

As the use of box traps proved to be somewhat slow, a small enclosure, or corral, was hastily constructed adjoining a large shed, and so arranged that the entrance could be readily closed by a man stationed within the building. This plan proved an immediate success, the foxes entering the enclosure without hesitation, so that from five to forty could be taken at one time. Having been shut in the corral the animals were driven through a small door cut in the side of the shed into a room where they were caught by means of forked sticks pressed over their necks, these being superseded by boards with a U-shaped opening in one end. The foxes were then passed, one at a time, through a small door into a second room, where they were received by a gang of men and examined as to sex. The females were all released, while the majority of the males were killed by breaking their necks, the intention being to leave one male to every three females. All foxes liberated were marked as previously noted, and this mark was repeated whenever an individual was captured more than once, with the result that by the end of the season some animals had lost most of the fur on their tails.

The possibility of rendering the foxes polygamous remains to be seen, and it will

naturally take a series of careful observations extending over a number of years to definitely determine this point. At present it can only be said that the catch of the second season on St. George did not fall below that of the first, and some observations show that the male foxes will have intercourse with more than one female, while the bringing together of the animals that would, under natural conditions be widely scattered, is a most important factor in rendering them polygamous. The curious fact presents itself that in every instance save one, the number of males taken exceeded that of the females, even towards the close of the trapping season, but it is, of course, possible that this may be due to the attraction of the females for the males and not to any excess in the birthrate of the latter.

Mr. Judge's observations have made it clear that the foxes have no predilection for any particular locality, the question of food being the main factor in determining their distribution. This was proved by trapping at various parts of the island, the result being that comparatively few animals were taken save at the village, while those caught at one locality would subsequently be taken at another. Consequently by judicious baiting they can be readily enticed from all parts of the island to the vicinity of the village, where they can be taken by wholesale, in such manner that the total number of foxes on the island can be pretty nearly ascertained, as well as the proportions of the sexes. The blue foxes seem to lack the proverbial craft of the other species, for not only did they readily enter the pen, but, as shown, by the marks, they entered again and again, some individuals being captured no less than five times, while a few were taken twice in succession at intervals of about ten minutes. That the scent of man about the corral should not deter the foxes from entering is not surprising, since, except during the trapping sea-

son, they have no cause to fear him. Such precautions as that of taking the animals out in a boat so that they may be killed over water seem rather absurd, the more that when pressed by hunger they will even devour the skinned bodies of their own species. One piece of information desired, as to whether or not the foxes would wander off on the ice floes when they were being fed, has not yet been obtained because, curiously enough, during the two years that the experiment has been made the ice has not happened to touch St. George.

Incidentally Mr. Judge has made observations on the food, size and condition of foxes, and has shown that the pelt does not improve with age, as has commonly been stated, but that the yearlings and two-year-olds have the best fur. As for weight, the smallest fox weighed a little over eight pounds, the largest a trifle more than fourteen, the great majority weighing in the vicinity of ten pounds.

The outcome of these experiments will be awaited with much interest, and if by a little artificial selection and environment a naturally monogamous animal can be rendered polygamous, the supply of blue fox furs will be materially increased.

The table appended gives the results of the catch for the season of 1898-99, and the total number of animals must seem rather surprising to one familiar with the island.

It only remains to add that the greatest number taken in any one evening was 245, of which 61 were killed; the second best night's work was 211, and of these 57 were killed.

Foxes taken on St. George during the season of 1898-99:

| | |
|---|-----|
| Male Blue Foxes trapped and killed..... | 334 |
| Male Blue Foxes otherwise killed..... | 34 |
| White Foxes killed, males and females..... | 18 |
| Male Blue Foxes trapped and released..... | 110 |
| Female Blue Foxes trapped and released..... | 389 |
| Total..... | 885 |

F. A. LUCAS.

THE DEEP WELL AT WILMINGTON, N. C.

THE deep well which is now being bored at Wilmington, N. C., is of especial interest to geologists: (1) That in reaching granite, as it does at about 1109 feet, it shows the absence at this point of formations between the upper Cretaceous and the old crystalline floor underlying the coastal plain deposits; (2) it shows the existence there of an unfortunately and unusually thick series of salt-water-bearing strata, from 350 to 1100 feet below the surface; (3) it may throw some light on the relations between the deposits of the sand hill regions (generally classed as Potomac) and the upper Cretaceous beds penetrated by this well.

The well is located on the bank of the northeast Cape Fear river, at Hilton Park, one mile north of Wilmington. The river border at this point exhibits two terraces; one only a few feet above tide water, extending back a distance of 30 or more feet from the river; and the other rising 30 to 40 feet higher, extending back for a considerable distance, and indeed representing the general surface of the region. The difference in elevation between these two terraces represents the thickness of the remnants of the Tertiary fossiliferous clays and limestone and the overlying recent sands. The lower terrace represents the upper surface of the Cretaceous; so that the well starts in the Cretaceous clays and sands, and continues in them to a depth of some 1109 feet. In these sands and clays there are occasional beds of shell-rock and calcareous sandstone varying in thickness from a few inches to 30 feet, and occasional thin beds of clay containing small nodules or concretions. The sands are mostly micaceous and are usually quite fine grained, with a prevailing gray color. From about 700 to 800 feet, their color is decidedly greenish. Below 950 feet these sands become coarser and are interbedded with occasional gravel deposits,

but they continue fossiliferous to near the surface of the granite.

Waterbearing sands and gravels were penetrated at a number of points, notably at 380, 496, 520 and 574 feet; and at 1011 the largest flow, of nearly 400 gallons per minute, was encountered, with pressure estimated as sufficient to raise the column of water 80 feet above the surface. Unfortunately the water from each of these levels was highly brackish, and hence unfit for domestic use.

The fossil forms secured at different depths have been identified by Dr. T. W. Stanton, of the United States Geological Survey. The method used in sinking the well is the ordinary drill and sand pump; and, as might be expected, in some cases only fragments of shells were secured; but as the hole was of large diameter (12 inches near the surface, then 10 inches, and lower still, 8 inches) and the larger part of the matrix material quite soft, a minimum amount of drilling was needed; and many large fragments and many perfect forms were obtained.

Among the fossils secured from the upper 700 feet, classed as Ripley cretaceous, the following may be mentioned:

Cardium eufaulense Gabb, was found at 40 feet and 538-558 feet, and fragments of this or another *Cardium* were found also at 50, 485-490, 520-540 and 556-575 feet below the surface.

Anomia argentaria Morton, was also common, having been obtained at frequent intervals from 40 to 600 feet; and fragments of an *Anomia*, too small for specific classification, were also found 800 to 900 feet below the surface.

Exogyra costata Say, was abundant throughout the upper half of the section; and below 500 feet a varietal form of this species, approaching *Exogyra ponderosa* Roemer in surface feature, was found almost to the granite.

Ostrea tecticosta Gabb, was common from 230 to 650 feet; and *O. larva* Lamarck, from 250 to 330 feet; and fragments secured at 518 feet probably belonged to one of these species. *O. subspatulata* Lyell & Forbes, was found only between 332 and 380 feet. Throughout the entire section, however, were found numerous fragments of *Ostrea* too imperfect to serve for specific determinations. *Veleda lintea* Conrad, and *Aphrodina tippana* Conrad (?) were found only at 340 to 500 feet. *Baroda Carolinensis* Conrad, and *Cyprimeria depressa* Conrad, were found only between 332 and 380 feet; and fragments of *Pecten* were found at 40 to 50 feet.

Gryphaea vesicularis Lamarck, was found at 250 to 265, and 720 to 735 feet (?); and *Inoceramus cripsii* Mantell, at 575 to 585 feet and probably also at 500 to 518 feet. Unrecognized species of *Avicula* or *Gervillia* were obtained at 390 to 400 feet; *Corbula* at 492 feet; *Pectunculus* 520 to 540 feet, and *Lunatia* 520 to 590 feet; *Lithophagus* 540 to 560 feet.

Cassidulus subquadratus Conrad, was observed at 518 to 538 feet, and echinoid spines and fragments of the same or allied species were also found at 100 to 170 feet. Sharks teeth, fish vertebræ, fragments of turtle shell, lignite and pyrite were found at intervals in the section.

Below 720 feet, and down to the granite (1109 feet) *Ostrea cretacea* Morton, which in the Chattahoochee river section is confined to the Eutaw beds, is here quite common; and is accompanied at intervals by *Anomia*, *Exogyra*, *Cardium* and *Serpula*, the specimens collected being in each case too fragmental to permit of specific determination. This lower 400 feet of the Wilmington section has been classed by Stanton as *Eutaw*; and it is possibly the seaward representative of the Potomac arkose sands and clays of the sand-hill region northwest of Fayetteville, should these sands and clays prove to represent the latest Potomac. It is more

likely, however, either that the Potomac deposits were removed from this region prior to the Eutaw deposition, or else that the surface of these old crystalline rocks was above water level during Potomac time, and hence not covered with deposits.

Underground temperatures were not taken at intervals at different depths while the work was in progress, owing to the lack of suitable thermometers; but there are now three wells only three or four feet apart, one 1100, one 500 and one 100 feet deep. The temperatures at the bottom of each of these, as determined by the use of a Darton deep well thermometer, were found to be 79°, 72.50°, and 68.50°F. respectively, giving a descending increase in temperature of about 1°F. for each 100 feet, between 100 and 500 below the surface; and 1°F. for each 98 feet, between 500 feet and 1100 feet below the surface.

J. A. HOLMES.

CHAPEL HILL, N. C.

GRANITES OF THE SIERRA COSTA MOUNTAINS IN CALIFORNIA.

THE Sierra Costa mountains occupy mainly the northeastern and northcentral portions of Trinity county, in northwestern California. They are the loftiest and most scenic portion of the Klamath mountain system, an off-shoot of the Sierra Nevadas. They consist, in general, of highly metamorphic elastics and ancient igneous rocks, including a basement crystalline formation, a massive serpentine, and a series of micaceous, chloritic, graphitic and hornblendic schists. All these are pre-Carboniferous in age; they have been subjected to intense orographic disturbance, folded and faulted on a grand scale, and into the fissures have been injected various granitic and dioritic dike rocks. Of these, granite, in huge batholites, is by far the most important and bulky.

Three principal types of granite are represented, and they present some interesting contrasts: hence this paper.

On the western side of the head-water portion of the south fork of the Salmon river in Siskiyou county, there is a huge white mountain of nearby bare granite—Mt. Courtney of the Cariboo range. It is a massive batholite of true granite, consisting of large individuals of quartz, white feldspar and dark brown biotite, *but little or no hornblende*. It is very coarse-grained, the three rock species being crystallized on a scale of one-fourth inch. The color is a very light gray, as a soda-feldspar is a predominant constituent.

The Courtney granite abounds in vein-like dikes of aplite, a much finer grained white granite, in which the biotite is in small foils and sparingly developed. The contrast between the massif of very coarse-grained granite and the included dikes of fine-grained aplite is strong. Evidently they both represent the same magma, but it seems that after the coarse granite mass had solidified in its upper portion, great fissures were formed in it and the aplite arose in them, solidifying to form the curious dikes of white granite. The former is coarse-grained, because, being in one great mass, it cooled slowly, and the latter is fine-grained, because, being in thin dikes widely scattered through an already solid rock, it cooled rapidly.

Near the contact between the Courtney granite and the hornblende schists on the east, both granite and schist are cut by dikes of a white muscovite granite, a kind of fine-grained pegmatite. This contains neither biotite nor hornblende, and is more resistant to weathering influences than the other granites of this area. These pegmatite dikes are cut by a transverse system of dikes of dark green diorite-porphyrite, which also occurs in the coarse-grained biotite granite of Mt. Courtney, as well as dikes of very fine-grained light greenish gray diabase.

On the east side of the head of south fork

of Salmon river, about three-fourths of a mile distant from Mt. Courtney, there is another granite batholite but it is composed of an entirely different type of granite. It contains the ordinary quartz, feldspar and biotite, but in addition, *it abounds in well-formed crystals of dark green and black hornblende.* The feldspar being largely plagioclase, it is a quartz-mica diorite, although its general appearance in the field is distinctively that of a granite. In fact, it is the rock commonly designated, by students of the Sierra Nevada region, granodiorite. It is finer grained and a darker gray in color than the Courtney granite.

This massif of granodiorite is at least a mile in length and one-half mile in width. It is one of a series of such granite masses scattered through the Sierra Costa mountains eastward from Mt. Courtney, some of which are as much as three miles in width. They all contain the large constituent of hornblende, and are characterized by spots of darker color, like included boulders of diorite-porphyrity, but which are probably concretionary in origin.

It is difficult to comprehend how such great masses of granite could be injected into the stratigraphic series, displacing the strata for miles. Mt. Courtney is but one of a series of high granite peaks extending southwest from it and apparently consisting of the same great massif of coarse-grained biotite granite, which may be ten miles or more in width. The strata of serpentine and schist must have been forced apart and up into high mountain masses, of which even Mt. Thompson, altitude 9345 feet, is but an insignificant remnant.

Between Mt. Courtney and the massif of granodiorite about three-fourths of a mile east of it, there is a block of mica and hornblende schists wedged in between the two granite masses. This dips steeply eastward, away from the Courtney granite and toward the granodiorite. As it approaches

the latter it becomes nearly vertical, but the strata are cut off by the granodiorite. The contact is finely exposed and shows no contact metamorphism. The dark green hornblende schists are absolutely unchanged to the very contact. Fragments of all sizes up to 100 cubic feet, of the hornblende schist are included in the granodiorite from the contact in places, 100 or more feet distant. Some portions of it are a veritable breccia of schist cemented by granodiorite.

Now, the edges of all fragments are sharp and the corners angular. Nowhere is there the least evidence of partial fusion of the schist material even along the edges, by the heat of the great mass of 'melted' granodiorite in which it had become included. If the latter was *very* hot, it appears evident that during the long time which such a great mass must have required in cooling, the hornblende and quartz, of the schist fragments must have partially fused. The failure of this to occur to even the slightest degree, implies, in my mind, that the granodiorite was not very highly heated—not nearly so much so as other dike rocks of the same region. Yet that it was in a highly liquid condition is proved by its injection into the finest cracks of the adjoining schist. In short, I believe there is here abundant evidence to demonstrate a perfect fusion without great heat, a sort of 'wet fusion,' we may suppose, due to the presence of heated alkaline waters. The fragments of hornblende schist were impervious to this water, the heat not sufficient to produce a 'dry fusion,' and hence the present phenomena, described above. As this locality may prove a very interesting one to students of igneous geology, I will give it as the vicinity of Lake Catrina, on the mountain ridge just east of the head of the south fork of Salmon river.

The age of all the granites of the Sierra

Costa mountains is practically the same. They belong to a period of orographic disturbance during which the intrusives were predominantly granitic in distinction from an earlier diabasic and a later dioritic period of igneous activity. This granitic period was post-Carboniferous and pre-Tertiary. To make a finer distinction, many of the granodiorite dikes can be demonstrated to have been formed after the Mariposa slates of late Jurassic age (which they cut), and before the Shasta-Chico shales and sandstones of late Cretaceous age (which lie upon their eroded surface).

An interesting problem yet to be worked out is the relation between the biotite granite of Mt. Courtney and the granodiorite of the mountain country to the eastward. Why two such strongly contrasted granites of apparently about the same age and mode of formation should occur in such close juxtaposition as the Courtney and Catrina batholites on opposite sides of the valley at the head of the south fork of Salmon river, is to me a puzzling problem and one well worth considerable study.

OSCAR H. HERSHEY.

AMERICAN PSYCHOLOGICAL ASSOCIATION.

THE eighth annual meeting of the Association was held at Yale University, December 27th-29th, in affiliation with the American Society of Naturalists. In point of numbers and activity the meeting was one of the most successful in the history of the Association. Professor John Dewey, of Chicago, the President of the Association, was present in the chair, and on the afternoon of Wednesday, the 27th, read his presidential address on 'Psychology and Social Practice,' in which he discussed the relation of psychology to education considered as a form of social practice with which psychology might be expected to have most immediate concern, and then generalized

the results reached to draw certain conclusions regarding the general value of psychology as a method to be applied in social life. (The address will appear in full in the March number of the *Psychological Review*.)

Following the address a formal discussion on 'How should psychology be taught?' was opened by Professor Fullerton, of Pennsylvania, who laid particular stress upon the question of the adjustment of the relative claims of the so-called 'new' psychology or psychology of the laboratory and the 'old,' which depends largely upon introspective analysis. He emphasized the necessity of both aspects in a general course, as well as the danger of giving undue prominence to either, and particularly, in America, to the experimental, owing to the tendency to extreme specialization in the subject in this country. Professor Fullerton further discussed the attitude which the university should take toward advanced students in the light of their future work. Professor Jastrow, of Wisconsin, continued the discussion and urged the importance of what he termed a 'functional' psychology in teaching, having the student verify facts and principles from his own experience, so far as possible from his own daily mental processes. He showed further the great value which experimental experience has for the introspectionist and agreed with the former speaker in deploring the quasi-antagonism of the two sides, arguing that both experiment and introspection are necessary and that they are complementary and in no way antagonistic. Professor Aikins, of Western Reserve, followed with a statement of the results of his own experience in teaching the subject, and described his method of combining experiment and textbook with collateral conferences. Professor Judd, of New York, closed the formal part of the discussion by calling attention to the peculiar difficulties encountered by the stu-

dent of psychology due to the nature of the subject matter, the difference between observation and interpretation, and his questioning of inferred facts owing to the indirect method of arriving at them. The speaker argued that the difficulty is best avoided by first studying the indirect modes of treating subjective experience, that is, by a study of the physical and physiological conditions of mental life, always keeping in view its relation to the final treatment of mental experience toward which it is aiming. The discussion was continued informally by a number of the members from the floor.

The general program was long and varied. On Wednesday morning Professor E. F. Buchner spoke on 'Volition as a scientific doctrine,' and Professor G. S. Fullerton on 'The criterion of sensation' continuing a discussion developed in a paper on 'The psychological standpoint,' read before a former meeting of the Association, which endeavored to show what is implied in the recognition of psychology as a natural science. This was followed by what proved to be one of the most interesting papers of the session, viz., 'A new arithmetical prodigy with demonstration' by Professors E. H. Lindsay and W. L. Bryan. The subject is a boy, nineteen years old, the son of a stone mason, who has attended school seven years, made a fair record in all his studies and is of good general intelligence. Since the age of three he has shown a passion for numbers and has developed extraordinary powers in calculation. Since November, 1899, he has been under investigation at Indiana University. This investigation has been general and thorough and is still being carried on. The principal results thus far are as follows: In scope and tenacity of memory and in rapidity he ranks among the best recorded cases. He is unique in the large number of methods which he has worked

out, and in the fact that he explains how and when he arrived at these. His rapidity is found to depend upon the great number of number relations committed to memory and upon the reduction in the number of operations through short-cut methods. The boy was present and gave demonstrations of his powers on both Wednesday and Thursday mornings, which were followed with great interest.

Professor W. S. Monroe closed the first session with a paper on 'Moral perceptions of school children,' describing an experimental investigation.

On Thursday morning the Association divided into sections, one for experimental reports and one for papers of more purely philosophical scope. Owing to the length of the program this sectional division was continued up to the end of the meeting. The experimental section on Thursday was opened by Professor E. A. Kirkpatrick on 'Individual tests of school children.'

Dr. T. L. Bolton spoke on 'The Reliability of certain methods for measuring the degree of fatigue in school children,' criticising the method of Griesbach with the æsthesiometer and the application of the ergograph to determine the fatigue value of subjects of the school curriculum. The speaker described experiments of his own, and reached conclusions unfavorable to the methods named. Professor E. F. Buchner described in detail 'A new number form,' and Dr. Robert MacDougall followed with a paper on 'The time values of accented and unaccented elements in rhythm.' Professor Chas. H. Judd described 'A method of securing enlarged records of voice vibrations' on smoked paper by means of an arrangement of two diaphragms. Records made were exhibited, and a detailed analysis of a four-syllable word was reported. Dr. E. W. Scripture reported on 'Researches in experimental phonetics.' Dr. Max Meyer spoke on 'Elements of a psy-

chological theory of music,' criticising sharply the current theories and insisting particularly upon the necessity of the number 7 in a scientific theory of music.

Dr. A. H. Pierce closed the session with a paper 'Is there an independent auditory space?' The speaker argued for the affirmative, basing his conclusion upon the phenomena of 'intra-cranial localization' occurring when two fusing sounds are given simultaneously, one at each ear, the resultant reference to the interior of the head being a genuine auditory phenomenon and not a localization made by the aid of factors borrowed from the visual or tactual space fields.

In the meeting of the philosophical section, held simultaneously with the foregoing, papers were read as follows: Professor E. H. Griffin, 'The natural history point of view in psychology'; Professor J. H. Hyslop, 'Kant's doctrine of apperception and the use of the categories'; Professor William Caldwell, 'Pragmatism'; Professor J. A. Leighton, 'Metaphysical method'; Professor Alexander Meiklejohn, 'The concept of substance.'

On Thursday afternoon the psychologists adjourned to meet with the naturalists for their annual discussion, Professor Jastrow representing the Association.

At the meeting of the experimental section on Friday morning, the first paper was by Mr. Clark Wissler on 'Some experiments on motor diffusion.' Mr. Wissler reported experiments showing the time relation between the primary, voluntary contractions of finger muscles and the accompanying secondary, unintentional contractions of the other arm muscles, the latter being due to a diffusion of the motor discharge. Primary contractions are first in order of time and are followed by secondary contractions in an order corresponding to their distance anatomically from the muscle innervated. Further, training finger muscles trains other

arm muscles and training biceps trains finger muscles. Secondary contractions also take place on opposite side of the body. He argued that transference of practice effect is simply the result of diffused nerve currents.

'The influence of special training in general ability' was the subject of a paper by Drs. E. L. Thorndike and R. S. Woodworth. Experiments were reported in which special abilities were studied as follows: (1) The speed and accuracy of making certain complex observations, *e. g.*, of picking out from a page of print all the verbs or all the words containing both *r* and *e*, etc., etc. (2) The recognition of weights, lengths and sizes. (3) Attention to and retention of names. (4) Discrimination of two complex objects shown successively. In each set of experiments, after training in some one line, the subject was tested for general improvement in the same field. As far as the research has gone, the experiments fail to detect any pronounced influence of special training on general ability except in so far as a person may acquire in a special line of work certain methods and ideals of accuracy and speed which may be of use in other lines.

Professor J. McK. Cattell read a paper 'On relations of time and space in vision.' Experiments were reported showing that a surface moving under a window in a screen appears larger than the window and that if the surface exhibit two colors successively, say green followed by red for $\frac{1}{10}$ sec. each, the observer sees not green followed by red, but the two colors side by side or variously intermingled, the arrangement varying with the observer, but making for perception a spatial continuum. On the other hand, if the line of sight moves over objects, say a row of books on a shelf, each retinal element is successively stimulated but the objects are seen simultaneously, side by side, without fusion, even though the intermittent stimulations be as frequent as 1000 per second.

Thus fusion and indeed all phenomena of color-vision seem to be cerebral rather than retinal.

Professor E. B. Delabarre spoke on 'Conditions affecting the judgment of the direction of lines.' In the judgment of the vertical, besides the factors usually recognized, the following are of especial importance: (1) Attention—fixation does not usually coincide with eye fixation; the latter wanders much though unconsciously, and causes supposedly fixated line to appear constantly changing in degree and direction of inclination; (2) muscle-strains in eye and head also influence the apparent inclination. These same influences affect also other judgments of direction as well as of length and distance. Certain conditions as of illumination, etc., produce definite strains and tendencies to fixation of particular kinds which furnish a fundamental explanation for many forms of geometrical optical illusions.

Professor E. C. Sanford reported briefly upon 'Recent studies in the Clark laboratory,' with the following titles: (1) 'The development in school children of the ability to reproduce rhythms'; (2) 'The rhythm of nursery rhymes'; (3) 'The mental properties of the white rat as tested with the maze.' The first and last of these are portions of more extended studies of the general topics of rhythm and comparative psychology, and all are expected to appear in the *American Journal of Psychology* during the coming year.

Professor Joseph Jastrow discussed 'Pending problems at the Wisconsin laboratory,' and demonstrated various pieces of apparatus, many of them connected with the study of problems in visual perception. The Wood pseudoscope and the reflecting stereoscope were exhibited and explained, and a device for simplifying the demonstration of retinal shadows was shown. The demonstration further included a brief account of experi-

ments in progress on the power of distinguishing in a shadowless light between convex forms varying slightly and regularly in degree of convexity. The sorting apparatus (see *Psychological Review*, May, 1898), was exhibited in its perfected and portable form.

Dr. E. W. Scripture demonstrated several devices in use in the laboratory where this meeting was held, and after some informal contributions and discussion the section adjourned.

In the philosophical section papers were read as follows: 'On practical procedure in inference,' by Professor J. G. Hibben; 'Elements of consciousness,' by Professor Mary Whiton Calkins; 'Choice and nature,' by Dr. E. A. Singer, Jr.; 'Methodology and truth,' by Professor J. E. Creighton; 'The spiritual principle in T. H. Green's philosophy,' by Professor E. B. McGilvary; 'The relation between the moral order and the natural order of the universe,' by Dr. David Irons; 'The development of content in moral judgments,' by Miss Ellen Bliss Talbot; 'The relation of ethics to religion,' by Professor W. G. Everett; 'The contents of religious consciousness,' by Dr. J. H. Leuba; 'Causes of scepticism,' by Professor E. H. Sneath.

At the business meeting Professor Joseph Jastrow, of Wisconsin, was elected President for the ensuing year, and Professors Ladd, of Yale, and Bryan, of Indiana, members of the Council; Professors James and Ladd were elected delegates of the Association to the International Psychological Congress to be held in Paris in 1900, and the Council was empowered to call a meeting of the Association in June in connection with the American Association for the Advancement of Science which will meet at that time at Columbia University.

LIVINGSTON FARRAND,
Secretary.

COLUMBIA UNIVERSITY.

MEETINGS AT COLUMBUS, OHIO, AND NEW
HAVEN, CONN., OF SECTION H, AN-
THROPOLOGY, OF THE AMERICAN
ASSOCIATION FOR THE AD-
VANCEMENT OF SCIENCE.

THE meeting at Columbus began with the installation of the chairman, Professor Thomas Wilson and the election of a secretary in place of Dr. G. Dorsey, resigned.

The report of the committee for the 'Study of the White Race in America' was presented by Professor Cattell; it was proposed to establish a station for making certain physical and mental measurements at the next meeting of the Association.

In a paper on 'New Anthropometric Methods' Professor Cattell showed some photographs taken with a centimeter netting close to the face; the method was said to be of special value in making permanent records of an indefinitely large number of measurements. Dr. Frank Russell, in a well-illustrated paper told of his measurements on the skeletons of the Labrador Eskimos and New England Indians. Professor W J McGee described the beginnings of mathematics.

The archæological side of anthropology was well represented. Professor G. Frederick Wright claimed that the separation between the Columbia and Trenton deposits was not so great as supposed by many; an account of observations supporting this claim was given in a paper on the 'Correlation of the Glacial Deltas in the Lower Part of the Delaware and Susquehanna Rivers.' Mr. Cresson's finding of a paleolithic implement in a deposit correlated to the Columbia deposit need not be received with incredulity, as "this would not imply an antiquity more than two or three thousand years greater than that which is implied in the genuineness of the Trenton deposit."

Dr. W. A. Phillips gave a richly illustrated paper on the 'Aboriginal Quarries

and Shops at Mill Creek, Union County, Illinois.' A paper was read from Dr. Robert Steiner on a 'Prehistoric Settlement, Big Kiokee Creek, Columbia County, Georgia,' with an account of numerous finds. Dr. Charles Slocum brought forward evidence showing the existence of prehistoric man in the Maumee River Basin.

Dr. Steiner also sent a paper on 'Allan Stevenson's Trance.' Professor McGee read a paper on the 'Cherokee River Cult,' by James Mooney. An account of 'Instruction in Anthropology in Europe and America,' was given by Dr. G. G. MacCurdy. Charles K. Wead gave an account of the 'Natural Diatomic Scale.'

The psychological side of anthropology was represented in the report and paper by Professor Cattell above referred to.

A paper, illustrated by lantern diagrams, was given on the results of 'Researches in Experimental Phonetics,' wherein the curves of the sound-waves in certain vowels and diphthongs had been carefully measured. 'The Inadequacy of the Present Tests for Color-blindness' pointed out the fact that the wool-test, in spite of its universal use in American railways, was not adequate to eliminate color-blind persons from posts where that defect is dangerous; a new color-sense tester was exhibited. In a paper on 'Observations on After-images and Cerebral Light,' several new observations were given as to the results of displacing the eyeballs in the effect of retinal (cerebral) after-images, Purkinje's figures and the image of the yellow spot. In observations on the 'Economy of Sleep' various methods of lengthening sleep were discussed. These four papers were by Dr. E. W. Scripture.

The Columbus meeting was a pleasant and successful one. Over 300 persons were registered for the general Association. The attendance in Section H ran as high as a

hundred. The plan was used of connecting all the sections by a telephone system, and of having in each room a blackboard with the titles of the papers being read in all the other sections; a person attending one section would remain until the announcement of the occurrence of some paper which he wished to hear in another section. The excursions to the gas fields, the coal mines of Hocking Valley, to Ft. Ancient, etc., were specially interesting features provided with a generosity truly Ohioan. The success of the meeting was largely due to the activity of the local committee and its chairman, Professor Thomas.

Professor Amos W. Butler, of Indianapolis, was elected to be Chairman, and Dr. Frank Russell, of Cambridge, Mass., to be Secretary of Section H, at the next general meeting of the Association. This meeting will occur during the third week in June, 1900, in New York City. Dr. Russell kindly performed part of the duties of Secretary at the Christmas meeting.

The special winter meeting of this Section was held in New Haven, Conn., on December 27th to 29th.

At the opening of the meeting Professor Wilson spoke on the need of introducing the Bertillon system uniformly into the measurements of criminals, conscripts, etc., and avoiding the present confusion of two systems and no system. Professor J. McKeen Cattell spoke of the projected station for measuring the members of the American Association for the Advancement of Science, at the next meeting in New York. Dr. J. W. Seaver's account of the result of the measurements of the women in the Freshmen classes in the three colleges at Wellesley, Oberlin, and the University of Nebraska, created considerable comment.

Professor Joseph Jastrow's paper on the anthropology of the occult, suggested the fundamental factor of thought involved in the vagaries of mind of the astrologers, al-

chemists, mesmerists, faith-cures, and similar folk.

'The art of the Thompson Indians' was described and illustrated with blackboard sketches by Professor Franz Boas. The graphic art of this tribe differs widely from that of the natives along the coast: they employ simple motives, each of which has a symbolic meaning; in some cases decorating extensive surfaces by repetition of the elements of the design. The following paper by R. B. Dixon upon 'Some basketry designs of the Maidu Indians of California,' gave an account of an art perhaps somewhat more advanced but illustrating the same principles of conventionalism and repetition. A paper upon a kindred topic, 'Symbolism of the Arapaho Indians,' by Dr. A. L. Kroeber closed the morning session.

At the opening of the afternoon meeting, Prof. Franz Boas presented the results of the investigations of Captain G. Comer among 'The Eskimos of Hudson Bay.' The natives of Southampton Island are of special interest to the anthropologist, owing to the fact that they have escaped thus far the contamination that inevitably results from contact with white 'civilization.' They are literally a Stone Age people. The paper upon the 'Archæology of the Thompson River Region,' read by Dr. Harlan Smith, was illustrated by a number of lantern views, showing the talus slopes and other localities where graves were examined, as well as the disposition of their contents, together with various artifacts of the peoples inhabiting the region prior to the arrival of the whites. John R. Swanton, in a paper upon the 'Morphology of the Chinook verb,' stated that the Chinook language exhibited many characteristics peculiar to itself that differentiated it from other American languages. Ales Hrdlička presented the results of his 'Observations on the Ute Indians,' which included an account of their

arts and customs, and especially of their physical structure. He regards them as inferior in every way to the adjoining Navajos; considerable uniformity of physical type prevails throughout the various bands composing the tribe. Dr. George T. Stevens exhibited a number of pieces of apparatus for testing the vision, and spoke of 'The pose of the body as related to the type of the cranium and the directions of the planes of vision.' Dr. Stevens also exhibited a number of lantern views illustrating the abnormal poise of the head that results from the adoption of an incorrect plane of vision, which he believed to be in some measure due to the shape of the eye socket, represented in craniometry by the orbital index.

An exhibit of stereoscopic and triple-color slides was made by E. W. Scripture, who also took the occasion to give the first public demonstration of his method of producing anæsthesia by an alternating electric current of moderately high frequency and without drugs of any kind.

The morning session of Thursday opened with a paper by Vice-President Wilson, entitled 'Similarity of thought not necessarily evidence of similarity in culture,' in which he dwelt more particularly upon the evidence obtainable among the higher civilizations—the evidence from the more primitive cultures having been presented in his address at Columbus. Dr. Wilson's investigations lead him to the conclusion that striking similarity or identity of thoughts is extremely rare in literature. G. F. Wright exhibited a number of specimens from Ohio, one of which, a 'Flint core with supposed artificial chippings found in the undisturbed gravel of the Tuscarawas Valley, at Massillon, Ohio.' George H. Pepper read a paper entitled 'Mosaic objects from Pueblo Bonito' that described the ceremonial objects inlaid with jet and turquoise, which have been found

among the ruins of the Chaco cañon by the expedition organized by Messrs. B. T. B. and F. E. Hyde and under Mr. Pepper's direction.

Dr. D. A. Sargent presented the results of an extended investigation of physical correlations among Harvard students, particularly with reference to the 'Relation of height, weight, and strength to the cephalic index'. The dolichocephalic men were shown to be taller, heavier and stronger than the brachycephalic. In the discussion it was pointed out that this was in a great measure due to the fact that within the group the tendency is always toward dolichocephaly in the taller individuals and, furthermore, that the environment of the descendants of the earlier immigrants of a dolichocephalic stock was much more favorable than that of the other group. Frank Russell presented a preliminary paper upon 'Some cranial anomalies.' His investigations were made upon a series of over sixteen hundred crania of the American race, the percentages of occurrence of the various anomalies were tabulated, and the results presented a statistical form. George G. MacCurdy exhibited a number of 'Iron figurines from Styria' and described the character and distribution of this curious survival of primitive superstition.

The short afternoon session of the Section was devoted to the paper presented jointly by F. W. Putnam and G. F. Wright upon 'A human bone from the Trenton Gravels.' This important discovery must effectually silence many of the opponents to the theory of the antiquity of man in the Delaware Valley. The bone was found on the first of December, 1899; it is a section of a human femur, showing traces of having been artificially worked. It was found in the stratified and undisturbed gravels seven feet below the surface, at the margin of a canal that is being cut through the plateau,

at Trenton. Several lantern views of the bone and of the locality from which it came were shown. It was moved that a vote of thanks be tendered the gentlemen, the Duke of Loubat and Dr. F. E. Hyde, who have advanced the funds necessary for the maintenance of the explorations by Mr. Volk, at Trenton.

At the meeting with the Folk-Lore Society on Friday morning, Section H was called to order by Vice-President Wilson for a short session, during which the committee appointed at the Columbus meeting to consider the advisability of advocating the introduction of the science of anthropology into the curricula of the higher institutions of learning, made its report. The report is given below.

After the adjournment of the Folk-Lore Society, the Section again met to hear Dr. E. Solotaroff read a paper upon 'Comparative Psychology.'

The following report of Committee on Introduction of Anthropologic Teaching, W J McGee, Chairman, was presented:

TO THE CHAIRMAN OF THE SECTIONAL COMMITTEE AND MEMBERS OF SECTION H, A. A. S. :

Your Committee on the Introduction of Anthropologic Teaching having exchanged views, chiefly through correspondence, beg to submit a preliminary report, defining a policy and outlining a plan for further work which seem to them feasible.

1. Your Committee are strongly of opinion that anthropologic teaching should be introduced in educational institutions of higher grade as rapidly as practicable; and they are strongly of opinion also that the Anthropologic Section of the American Association for the Advancement of Science is the fittest organization of national character to undertake the introduction of such teaching.

2. Your Committee fully appreciate the difficulties in the way of introducing anthropology into established curricula, especially (a) the attendant cost to the institutions, (b) the lack of definite information concerning the aims and scope of the science. With the view of overcoming these difficulties, the Committee have been led to recommend a plan for acquainting educational institutions with the methods and purpose of anthropology at a minimum cost, with the expectation that the interest thereby developed may lead to adequate provision for the subject in later curricula. The adoption of the plan would involve personal sacrifice on the part of working anthropologists willing to contribute in time and thought, but would seem to give promise of general advancement in the science.

3. Your Committee recommend that anthropologists desirous of promoting anthropologic teaching in America unite in offering to deliver, before high grade universities and colleges in which anthropology is not now taught, lectures outlining the science, explaining its great interest and utility, and setting forth its adaptability for college teaching; such lectures to be, at the outset, gratuitous, save for suitable provision for traveling expenses.

4. Your Committee recommend that, for the purpose of carrying out this plan, they be continued and given power to act and add to their number.

Your Committee suggest that any unexpended balance of the appropriation by the Council of the A. A. A. S. for the incidental expenses of the New Haven meeting of the Section be allotted for the printing of a suitable circular to be issued to educational institutions of higher grade.

E. W. SCRIPTURE,
Secretary.

TWELFTH ANNUAL MEETING OF THE GEOLOGICAL SOCIETY OF AMERICA, WASHINGTON, DEC. 27-30TH.

II.

On reassembling Friday morning the first paper was the following:

STRATIGRAPHY OF THE POTTSVILLE SERIES IN KENTUCKY.

MARIUS R. CAMPBELL, Washington, D. C.

This paper treated of the areal distribution of the conglomerates of the Pottsville series along the western margin of the Appalachian coal field in Kentucky and Tennessee. Three distinct horizons of conglomerates were described which heretofore have been regarded as a single stratum. Attention is called to the unconformity at the base of the series, and the vertical expansion southward was illustrated by numerous sections measured along the margin of the field.

In discussion David White remarked his having mentioned to the Society that the relatively thin cross-section of the carboniferous in this region only represented a part of the thick eastern outcrops. The older eastern Pottsville is lacking. I. C. White remarked the harmony of the results with those attained in Pennsylvania, and that in the late seventies he had realized the complex nature of the Pottsville in Pennsylvania and Ohio. He commented on the thickening to the south. David White also remarked the trough to the south. W. M. Davis asked about the relations of the marine deposits with corresponding fossils, and the fragmental deposits with land plants. J. J. Stevenson remarked the relations of the Devonian and Carboniferous continent to the sea. The Devonian is thin to the south and thick to the north, whereas the Lower Carboniferous is thin on the north and thick to the south.

I. C. White, replying to W. M. Davis, said that the invertebrate fossils were marine and

that the sandstones contained lime. M. R. Campbell said that the materials of the sediments are quartz and that they could not have been derived from lower-lying rocks, which are limestones. The quartz probably came from the Carolina mountains and therefore the water-body was large. Bailey Willis suggested that the Pottsville represented a coastal plain, which was successively transferred, worked over and concentrated.

RELATIVE AGES OF THE KANAWHA AND ALLEGHANY SERIES AS INDICATED BY THE FOSSIL PLANTS.

DAVID WHITE, Washington, D. C.

From an examination of the stratigraphic distribution of the fossil plants of the Kanawha Series in southern West Virginia, it appears that only the upper half of the Series contains the common and characteristic elements of the floras of the Alleghany Series of Northwestern Pennsylvania. The lower half carries a flora which seems distinctly older than any of the floras which occur above the lowest coal of the Alleghany Series.

The plants of the lower Kanawha Series are comparable to those of the Lower Coal Measures of the old World, whereas the plants of the Alleghany Series in Pennsylvania are referable to the Middle and Upper Coal Measures of the European basins.

The discussion of the correlation of the coal floras of the two regions was followed by a brief statement of the stratigraphic changes and conditions of deposition in the Virginian region, as indicated by the distribution of the fossil plants.

I. C. White stated that although the floras changed from Pennsylvania to the Kanawha, the coal seams and sandstones could be traced without a break, from hill to hill. He, therefore, maintained the physical identity of the seams, viz., the Upper Freeport and the Stockton; one of the Kittanings and the Peerless gas coal,

etc. M. R. Campbell remarked the possible diagonalizing of sandstone and shales, and the pinching out of some. J. J. Stevenson corroborated I. C. White's statements to the letter, and insisted that the difference was a botanical and not a stratigraphic one. H. S. Williams supported David White by analogies drawn from the Catskill problem. I. C. White, in reply, again described the continuity of the Upper Freeport with the Stockton. He also stated that the marine forms contradicted the plants; that an abundant marine fauna beneath the Eagle coal corresponded with that of the ferriferous limestone. H. S. Williams and then I. C. White spoke again, but it was evident that there was a deadlock between the paleobotanists and the field geologists. The difference was so pronounced that all the rest of the Society hoped the two Messrs. White would go together over the field from one end to the other and report at a later meeting.

NEWARK FORMATION OF THE POMPERAUG VALLEY, CONNECTICUT.

WILLIAM HERBERT HOBBS, Madison, Wis.

The Newark formation of the Pomperaug Valley rests unconformably upon and is entirely surrounded by Cambrian and pre-Cambrian gneisses. Its sedimentary beds consist mainly of material of other than local derivation, associated with which are sheets of basalt which were once poured out at the surface. Subsequent to their formation the rocks of the area were elevated, tilted to the southeastward at a low angle, and while in this inclined position depressed an amount not less than 2000 feet. This depression of the area was accomplished through an elaborate system of dislocations (gravity faults) involving hundreds of individual fault planes. Of these more than 200 have been mapped.

The fault planes as mapped are quite regularly spaced. The area is thus cut up

into blocks of regular shape, and these blocks are in some cases found to be further subdivided by parallel faults of small displacement until the faulting passes ultimately into prismatic jointing. The directions of the fault planes, which have almost a vertical hade, bear N. $54\frac{1}{2}^{\circ}$ E., N. $5\frac{1}{2}^{\circ}$ W., N. 15° E., and N. 34° W., with less common faults in other directions. Whenever large displacements have resulted from faulting, they are found to be distributed over a number of parallel planes, so as to produce a regular step, or *rampart* structure.

The crystalline gneisses and schists surrounding the basin of the Pomperaug Valley have been deformed by faulting in the same manner as the Newark rocks themselves, thus making it clear that the theory of "lateral compression and differential faulting by accommodation of beds within the gneiss formation" cannot explain the faulting of the Newark formation, as has been claimed.

The peculiar block faulting discovered within the area has brought about a number of topographic forms of relief that have not before been recognized. The drainage of the entire area is found to conform to the deformation, so that both major and minor streams run in courses like eaves-gutters—broken lines with sharp elbows, the elements in the course corresponding in directions with the fault directions named above. The stream channels are generally square in cross section, with a level floor of nearly uniform width, similar to that of an artificial canal. The Pomperaug River, which drains the area, is an illustration of reversal of drainage brought about by the 'discovery' of an upfaulted block of gneiss in its bed. This has resulted in producing a new base level with the formation of a lake above it, which in a later stage has been drained by the pushing back of the divide of one of the principal tributaries, so as to capture the headwaters.

The broad terrane hypothesis regarding the extent of the Newark formation receives material support by this investigation, which shows that an irregular block of the Newark has been depressed below the level of the crystalline gneisses, so as to be by them protected from the abrasion of the ice of the glacial period. The system of faulting within the area furnishes many analogies with the cleavage of a crystal, the explanation of which is doubtless to be found in a probably strained condition of the area, due to the removal of support from below just previous to the time when the dislocations occurred.

The paper was illustrated by lantern slides.

It was followed without discussion by the next title, lunch however, intervening.

THE RIVER SYSTEM OF CONNECTICUT.

WILLIAM HERBERT HOBBS, Madison, Wis.

This paper is closely related to the preceding paper. The system of faults there observed was found to have determined the troughs in which flow the streams of the district.

The attempt has now been made to ascertain if the river system of the state indicates, throughout, the existence of similar troughs. A carefully prepared map based upon the recent topographical map of Connecticut by the U. S. Geological Survey, shows that all the master streams, together with their numerous tributaries, flow in troughs which correspond closely in direction with the fault directions of the Pomperaug Valley system, and with two additional closely related directions. The individual troughs can generally be followed into adjacent states, but no attempt has been made to determine their full extent. Some indication of a regularity in the spacing of the parallel troughs is afforded by the map.

The inference from these facts is that the entire area of the state of Connecticut (and

presumably a considerably larger area) has been deformed by faulting in much the same manner as that of the Pomperaug Valley.

The paper was illustrated by a map and by lantern slides.

B. K. Emerson remarked the continuation of these faults to the north into Massachusetts. H. B. Kummel inquired about the fault scarps and whether the cliffs shown in the views were the result of hard and soft beds. The author replied that they were eroded fault scarps. J. F. Kemp remarked the close correspondence of the phenomena in general with others in the Adirondacks and raised the question of the age of the northwest series as shown by the diversion of the Connecticut at Middletown. W. M. Davis discussed the general influence of faults in the early drainage, but thought that they would not be so influential in later time. He also remarked the possible effects of the mantle of Cretaceous strata which may have covered Connecticut. The effect of drift was cited in influencing the course of the rivers. He also felt that the faults were too rectilinear for natural cases. R. D. Salisbury raised the question of the possible connection of the direction of glacial striae with the rivers. Dr. Hobbs replied that there seemed no apparent one. H. W. Turner inquired whether the faults might not be so recent as to have had influence. Dr. Hobbs admitted its probability and cited the reversal of the Pomperaug by a block of gneiss. In general the paper excited the greatest interest, but the feeling seemed to be, that too many and closely related fault systems were carried over the state, and that too great emphasis was not to be placed on the correspondence of the rivers here and there with them.

JURASSIC ROCKS OF S. E. WYOMING.

WILBUR C. KNIGHT, Laramie, Wyo.

This paper reviews the early history of the Jurassic investigations in Wyoming

and gave the distribution of both the marine and fresh water beds in that portion lying east of the North Platte river and south of the Fremont and Elkhorn Railroad. Geological sections from several localities were discussed and reference was made to their fossilized remains. The Jurassic were distinguished from the Triassic. The question was raised as to the advisability of retaining the double term Jura-Trias, and its retention was opposed. The age of the fresh water beds was discussed. Some hints were then given as to the grouping of the Rocky Mountain Jurassic beds and the correlation of them with European.

S. F. Emmons remarked the interest of the work and the contrasts afforded by the Wyoming Jurassic with the Colorado beds. H. W. Turner spoke of the desirability of dropping the name Jura-Trias. W. H. Weed mentioned the parallelism with the Yellowstone Park Jurassic. Bailey Willis explained the early use of the term Jura-Trias, as coördinate with carboniferous and cretaceous, and that it would be split up into local names in the inevitable development of field observation.

THE CRETACEOUS AND TERTIARY SECTION BETWEEN CAPE FEAR AND FAYETTEVILLE, N. C.

J. A. HOLMES, Chapel Hill, N. C.

The speaker remarked the importance of the Hatteras uplift, which extends westward through the 'Sand Hill' region. An east and west section was exhibited passing through Wilmington, N. C., and it was shown that there was a great unconformity between the Cretaceous embracing the Eutaw (300') and Ripley (800') and the Tertiary. In the Tertiary very important erosion intervals were also shown at the close of the Eocene and Lafayette.

The paper was discussed by W. B. Clark, who remarked the relations of the strata to

others to the north and especially the absence of the Potomac bed. N. H. Darton made a comparison between the section of the Wilmington well and the Norfolk well. G. B. Shattuck remarked the great oscillations of the Atlantic coast that were indicated by these sections. He cited thirteen known unconformities in the coastal plain. T. W. Stanton described the relations of the fossils brought up by the wellborings, to others from Florida. J. A. Holmes remarked the location of the hinge line of the oscillations and the plans now maturing for their measurement.

MESOZOIC STRATIGRAPHY OF BLACK HILLS OF SOUTH DAKOTA.

N. H. DARTON, Washington, D. C.

The Black Hills uplift brings to view the entire series of Mesozoic formations underlying the plains. These comprise Laramie, Fox Hills, Pierre, Niobrara, Benton, Dakota, Lower Cretaceous, Jurassic and Triassic formations. A detailed investigation has been made by the author of the beds from Jurassic to Pierre, and a large amount of detailed data obtained. Fossils have been discovered in the Jurassic beds comprising fish in the basal members, as announced last year, the southern extension of the marine fauna in the intermediate series and additional Dinosaur remains in the upper beds. The relation of the Dakota to the Lower Cretaceous formations were set forth, and an account was given of many newly-discovered features in the stratigraphy of the Benton and Niobrara deposits. In the Pierre shales there has been discovered a horizon of calcareous lenses of *Lucina occidentalis* giving rise to tepee buttes somewhat similar to those described by Gilbert in southeastern Colorado. There was exhibited a fragment of fossil fish found in the Triassic Red beds.

The paper was followed immediately by the next title.

TERTIARY SHORE LINES AND DEPOSITS IN THE
BLACK HILLS.

N. H. DARTON, U. S. Geol. Survey.

It has been found that the 'White River' (Oligocene), lake deposits of western South Dakota extend far up the flanks of the Black Hills to shore lines, which are beautifully exhibited in a portion of the region. The relations of these deposits throw important light on the physiographic development of the uplift at several of its stages.

The paper was beautifully illustrated by lantern slides, but as the hour was late and no discussion ensued.

In the evening the Society attended the reception and session of the Washington Academy of Sciences, at which Messrs. Merriam, Gannett, Gilbert and Dall described its general results. A collation followed, which afforded an admirable and welcome opportunity for social intercourse.

The last session of the meeting was called to order at 9:45 A. M., on Saturday, December 30th, and showed a rather slim attendance owing to the departure of many of the members.

The first paper was presented by G. O. Smith and W. C. Mendenhall, and was on the 'Tertiary Granite of the Northern Cascades, Washington.' This granite, which a later petrographical study may show to be a quartz monzonite or quartz diorite, extends over an area of at least 100 square miles. It is intrusive between the Tertiary sedimentaries, as shown by the numerous dikes penetrating the surrounding rocks. The sedimentary rocks are slates, sandstones and conglomerates, and show interesting contact phenomena. Much of the slate is metamorphosed into hornfels, and there is abundant development of such minerals as garnet, epidote and tourmaline along the contacts.

This intrusive mass is important in its relation to the age of the sedimentaries, and

also in its relation to the basaltic flows farther south.

Professor W. M. Davis read the next paper on 'The Basin Deposits of the Rocky Mountain Region.'

The writer questioned the origin of the Tertiary lake beds of the West, and cited examples to prove his theory that many of them are fluvial in origin. The sorting out and distribution of the sediments comprising the strata in these beds indicated stream deposition, and, therefore, basin deposits, rather than lake deposits, is the proper term for these beds. He classed deposits according to three modes of origin—'lacustrine,' 'fluvial' and 'wash,' and argued for the fluvial and occasionally the 'wash' origin of many of the so-called 'Tertiary lake beds' of the Rocky Mountains. His theory was opposed by Messrs. Weed, Emmons, Cross and Russell, all of whom upheld the lacustrine origin of most of these deposits.

Professor A. P. Coleman presented a short paper on 'Heronite and its Related Rocks.'

Professor Coleman exhibited some specimens of this new analcite rock, which occurs as a series of parallel dikes near Heron Bay, Lake Superior. The rock corresponds chemically to nepheline syenite, and he thought perhaps a petrographical study would show the presence of nepheline. The typical rock consists of analcite in which radiating bundles of feldspar and acgirine crystals are imbedded: while a variety occurs with more feldspar in fluidal arrangement, and a second variety where the feldspar is in the form of spheres, sometimes two inches in diameter.

The succeeding paper was by Dr. H. S. Washington on the 'Magnet Cove Laccolith.' Since the excellent work of the late Dr. J. Francis Williams on the Igneous Rocks of Arkansas, much more has become known through the work of Brögger, Lagorio and others about magmatic differentia-

tion, and Dr. Washington's study of the Magnet Cove area leads him to believe that the soda-rich rock species abounding here are simply highly differentiated products of the same continuous flow, and not of three different periods of eruption, as was thought by Dr. Williams. Six analyses were shown which exhibited such a regular variation in the percentages of the various oxides, that the inference was strong towards magmatic differentiation. The central mass is a basic ijolite with low silica 36.51 per cent., and high calcium oxide and the surrounding more or less concentric masses increase their acidity giving, on the outer band a nepheline syenite with silica 53.38 per cent. and large increase in alkalis and low lime. These successive bands show abnormal arrangement.

Plagioclase is absent from the rocks. The abundant garnet is accounted for through the excess of lime, as shown in the analyses.

The time was too short to allow the speaker to dwell much upon the dikes, or upon the reason for calling the mass a laccolite.

The final paper was then presented by August F. Foerste on 'Further Studies on the History of the Cincinnati Anticline.' The theory held by former investigators that the age of this anticline is Lower Silurian and that the Upper Silurian strata were deposited during the gradual subsidence of the central mass, is untenable as shown by measurements of the adjacent strata. According to this theory the upper or last formed deposits would extend farther up the sides of the anticline, whereas careful measurements show that the lowest formations extend the greatest distance up the sides, and Mr. Foerste's theory is that these deposits at one time were continuous across the present anticline and on account of flexure and erosion now occupy the sides, thus indicating an age for the anticline later than the Upper Silurian.

Mr. Campbell agreed with the speaker that there was no evidence of Lower Silurian age for the anticline.

The following papers were then read by title by the President:

RECONNAISSANCE IN SOUTHEASTERN ARIZONA.

E. T. DUMBLE, La BARRANCA, Mexico.

ON THE AGE AND DISTRIBUTION OF THE SEDIMENTARY ROCKS OF PATAGONIA.

J. B. HATCHER, Princeton, N. J.

CRETACEOUS INVERTEBRATES FROM PATAGONIA COLLECTED BY J. B. HATCHER.

T. W. STANTON, Washington, D. C.

GEOLOGY OF THE WICHITA MOUNTAINS.

H. FOSTER BAIN, Des Moines, Iowa.

VOLCANICS OF THE NEPONSET VALLEY, BOSTON BASIN.

F. BASCOM, Bryn Mawr, Penna.

ENRICHMENT OF MINERAL VEINS BY LATER METALLIC SULPHIDES.

WALTER HARVEY WEED, Washington, D. C.

VEIN FORMATION AT BOULDER HOT SPRINGS, MONTANA.

WALTER HARVEY WEED, Washington, D. C.

GENESIS OF THE LIMONITE ORES OF PENNSYLVANIA.

T. C. HOPKINS, University of Chicago.

CONTACT METAMORPHISM OF A BASIC IGNEOUS ROCK.

U. S. GRANT, Evanston, Ill.

GEOLOGICAL STRUCTURE OF COFFEYVILLE (KANSAS) GAS FIELD.

G. PERRY GRIMSLEY, Topeka, Kan.

SURFACE TEMPERATURE OF THE EARTH.

ALFRED C. LANE, Lansing, Mich.

THE GLACIATION OF MOUNT KTAADN, MAINE.

RALPH S. TARR, Ithaca, N. Y.

POST-GLACIAL TIME IN HURON COUNTY, MICHIGAN.

ALFRED C. LANE, Lansing, Mich.

KEEWATIN OF EASTERN CENTRAL MINNESOTA.

C. W. HALL, Minneapolis, Minn.

KEWEENAWAN OF EASTERN CENTRAL MINNESOTA.

C. W. HALL, Minneapolis, Minn.

GEOLOGY OF QUEBEC CITY AND ITS ENVIRONS.

HENRY M. AMI, Ottawa, Canada.

GAS-WELL SECTIONS IN THE UPPER MOHAWK VALLEY AND CENTRAL NEW YORK.

CHARLES S. PROSSER, Columbus, Ohio.

VERTEBRATE FOOTPRINTS IN CARBONIFEROUS ROCKS OF WRENTHAM, MASS.

J. B. WOODWORTH, Cambridge, Mass.

About seventy fellows were in attendance and the meeting was a large and in every way an enjoyable one. The Fellows resident in Washington spared neither effort nor expense in entertaining the visitors, and the vote of thanks passed at the final session was a very sincere expression of a deeply felt sentiment.

In the above report the notes for the first three days were prepared by J. F. Kemp, those for the last day by A. S. Eakle.

J. F. KEMP.

COLUMBIA UNIVERSITY.

A. S. EAKLE.

HARVARD UNIVERSITY.

SCIENTIFIC BOOKS.

Electro-physiology. By W. BIEDERMANN. Professor of Physiology in Jena. Translated by FRANCES A. WELBY. Macmillan & Co. Vol. II., pp. 500.

Miss Welby's translation of the first volume of this well-known work was reviewed some time ago in these columns. It treated of the structure, contraction, and electrical stimulation of muscle, and of the electromotive phenomena of muscle, epithelium and glandular tissue. The second volume, comprising the structure, conductivity, excitability and electrical stimulation of nerve and the electromotive phenomena of nerve, electrical organ and vegetable cells, has now appeared.

When a physiologist of Professor Biedermann's eminence sums up the results of that department of the science which he has so brilliantly illustrated by the labors of a lifetime, and, knowing well how comparatively narrow will be the circle of his readers, lays his contribution at the feet of his fellow-workers, it may seem ungracious to criticise the gift. Yet we are bound to say, if criticism is not to abdicate its function, that praise must be tempered with censure in passing judgment on this book. That it is full of interesting and important observations, it is unnecessary to say. Even if the author had contented himself with an account of his own experiments this could not fail to be the case. But the treatment of the subject is not always so clear as might have been expected from so great a master. Unnecessary difficulties are placed in the way of the reader by the intricacies of a somewhat diffuse and ponderous style. The lack of proportion and perspective is conspicuous. The author, while doubtless himself well able to discriminate between the importance of weighty generalizations and that of petty experimental details, apparently makes little effort to help his reader to do so, and the student sometimes rises from the perusal with the feeling that he cannot see the wood for the trees.

The author naively admits, in the preface to his first volume, that he has not attempted to avoid partisanship in the treatment of certain topics which have given rise to the liveliest discussion and have separated electro-physiologists into warring camps. He has preferred, as he says, to present these thorny problems from the point of view of his master Hering, which happens also to be his own. The candor of this avowal almost disarms criticism. Yet we must say that although in a sketch such an attitude might be entirely excusable and even praiseworthy, it is to be doubted whether in a professedly exhaustive treatise like the present it is well to skate so lightly over the thin ice of controversy. For it is often impossible to thoroughly understand a question without a knowledge of the history of the disputes that have arisen in regard to it.

Like most of his countrymen, the author scarcely does justice to foreign and especially to

English-speaking physiologists. For instance, in speaking of the electrical variation produced when the retina is stimulated by light, the fundamental observations of Holmgren and of Dewar and McKendrick receive scant mention in comparison with the later, though doubtless valuable results of Kühne.

Of certain other sins of omission the candid critic has cause to complain. In a work of nearly 1000 large pages one would expect to find a highly special branch of physiology presented in an exhaustive way. Yet certain parts of the subject, and these not the least important, are barely sketched, while hundreds of pages are occupied with extraneous matter, or at least with matter which has no particular claim to be included. Why, for instance, should the structure of muscle and nerve, which is so much better treated in histological or anatomical works, cover over 60 pages, the discussion of the conductivity and excitability of nerve 60 more, and the alterations in form of the contracting muscle an additional hundred, while the secondary electromotive phenomena of nerve are dismissed in a bare half dozen pages?

Again, more than 50 pages are given up to the anatomy and histology of the electrical fishes, almost exactly as much space as is devoted to their electrical phenomena.

But although it is not free from faults, the book is a notable contribution to physiology, copious in its information, usually balanced in its judgments, and suggestive in the rare cases in which the author permits himself to speculate. The protest against Boruttau's extravagant hypothesis, which so completely identifies the negative variation with a physical katelectrotonus propagated in the form of a wave, seems to us entirely justified, and the arguments by which the protest is supported particularly cogent.

The translation is upon the whole well done, and better, we think, in the second volume than the first. Of course, as in all translations, there are a few cumbrous renderings which might be improved, and as in most, a few places where the meaning of the author is not expressed or is actually perverted. Occasionally a plural is inaccurately rendered by a singular. Not infrequently the otherwise com-

mendable love of terseness on the part of the translator has led to the omission of qualifying words which it would have been better to translate. As a rule, however, the Anglo-Saxon pruning-knife has been advantageously employed to redress the diffuseness of Teutonic style. The division of the chapters by secondary headings, scarcely attempted in the original, is a great improvement. But it is to be regretted that the weightiest conclusions, expressed in German in spaced type, should not have been similarly indicated in the translation.

In a new edition, which we hope may soon be called for, such errors as the following ought not to remain uncorrected: 'Sewing needle' for 'Stricknadel' (p. 37); 'become paler in color' for 'einen blässeren Farbenton annehmen' (p. 37); 'inequalities' for 'Unvollständigkeit' (p. 38); 'near the constrictions' for 'nebst den Schnürringen' (p. 42); 'the middle part of the nerve rests upon the electrodes' for 'auf genau gleichen Elektroden ruht die centrale Nervenstrecke' (p. 62); 'itself' for 'daher' (p. 69); 'the strength of the peripheral stimulus is the most important factor in the diffusion of irradiation' for 'ist die Stärke des peripheren Reizes von wesentlichem Einfluss, etc.' (p. 70); 'the organ of reflexes, the automatic central structure of the brain and spinal cord' for 'die reflexübertragenden und automatischen Centralapparate, etc.' (p. 78); 'built up' for 'geschlossen' (p. 87); 'exactly measurable' for 'genau abstufbaren' (p. 89); 'similarity' for 'Verschiedenheit' (p. 110) (doubtless a slip); 'differences of chemical reaction' for 'Verschiedenheit des Chemismus' (p. 111); 'the capacity of reaction, or alteration' for 'die Reaktionsfähigkeit, beziehungsweise Veränderungen derselben' (p. 111); 'when the action of curara has quite worn off' for 'wenn die volle Wirkung des Curare * * * nachliess' (p. 112). On page 199 we read: "Against the cogency of these experiments there is good evidence to indicate that the electrical taste depends not upon electrolysis of the fluids in the mouth, but upon direct excitation of the taste-nerves." This is the direct opposite of the statement in the original. On page 109 curiosity is awakened by the mention of induction currents "applied directly to a fresh section on the ventral surface of the

frog's spinal cord," but it is set at rest when we learn from the original that they were applied on the ventral surface of the spinal cord in the immediate neighborhood of a fresh cross-section. Again, some astonishment is caused by finding (on p. 51) that "one important fact that has hitherto been *overlooked* is the marked variation in calibre of medullated nerve-fibers." We ask ourselves whether it is possible that Biedermann did not know of the long series of investigations on this subject, beginning with those of Bidder and Volkmann half a century ago, and continued in our own day by Gaskell and his pupils and numerous other workers? On turning to the original, however, we find that Biedermann's innocent statement is that this important fact has not yet been '*mentioned*' (erwähnt) in his description. Similarly the at first sight somewhat mystifying contention of Grützner and Tigerstedt (p. 311) "that certain forms, perhaps, indeed, all opening twitches, produced by negative polarization currents are really closing twitches," becomes perfectly rational as a contention "dass gewisse Formen, ja vielleicht alle Oeffnungszuckungen durch den negativen Polarizationsstrom verursachte Schliessungszuckungen sind," which, being interpreted, means "that certain forms, indeed perhaps all opening twitches, are closing twitches produced by the negative polarization currents."

G. N. I. S.

Text-book of the Embryology of the Invertebrates.

By DR. E. KORSCHULT and DR. K. HEIDER. Translated from the German by MATILDA BERNARD, revised and edited with additional notes by MARTIN F. WOODWARD. Vols. II. and III. London, Swan, Sonnenschein & Co.; New York, The Macmillan Co. 1899.

The admirable text-book of Invertebrate Embryology by Drs. Korschelt and Heider is scarcely in need of recommendation at this late day. If embryologists owe a debt of gratitude to Professor Mark and Dr. Woodworth for the translation of the first volume of the work, their obligations are even greater to those who have undertaken the more arduous task of translating the three remaining volumes. The two volumes just published contain the development of the Phoronidea, Bryozoa, Brachiopoda,

Crustacea and Insecta. Those volumes have been made of equal size by an adroit transposition of some of the chapters of the original text. One notes with pleasure the abolition of the oft recurring word 'fundamental' which the translators of the first volume used in the place of the German word 'Anlage.' As some embryologists have of late been much distressed about the proper translation of this term, it may be well to repeat Mr. Woodward's eminently sensible remarks on the subject. He says: "Exception, with which I concur, has already been taken to the use of this term [fundament], on the ground that the word fundament implies the solid basis or foundation upon which a structure rests or is built, where as an 'Anlage' is essentially a changing, growing structure, which, though at one time the foundation, when only the foundation exists, eventually gives rise to, or rather itself becomes transformed into, the fully formed organ."

"Having thus decided against the continued use of this term, I found myself face to face with the responsibility of selecting one of the numerous terms which have at one time and another been put forward as the English equivalent of 'Anlage,' at the same time knowing full well that, whichever word was adopted, I should find a large number of biologists against me, as nearly every teacher of note has proposed at least one word which he believes to be the only correct rendering of 'Anlage.'"

"Realizing, then, the impossibility of satisfying everyone, I thought it advisable to pass over all the numerous terms which have been recently suggested, none of which are really satisfactory, and to revert to that much abused word—rudiment. Most biologists will agree that the term rudiment, if it had not been misused by some of our most eminent zoologists, would undoubtedly be the best word by which we could render the German term 'Anlage.' Unfortunately, following the lead of Darwin and others, we have acquired the habit of applying the terms rudiment and rudimentary to certain structures present in the adult, which, in consequence of their small size and frequent loss of function, have retained a somewhat embryonic stamp, thus preserving the outward appearance of a rudiment, but losing its essential

character, viz., its inherent tendency to further growth. These, then, are not rudiments, but arrested, reduced, vanishing, or vestigial structures, and should be spoken of as vestiges. Why, because Darwin unfortunately misapplied the word rudimentary, should we necessarily regard this misuse as hallowed, and ever after refuse to use the word in its common sense? To such an extent has this misuse of the word been carried that even encyclopædic dictionaries, after defining the word rudiment in such a manner as to prove that it is the very word we are seeking, as a rendering of the idea expressed by 'Anlage,' give us, under the technical use of the word, "In zoology, a part or organ, the development of which has been arrested (see Vestige)." It would require but little trouble on the part of teachers of biology to reinvest the word rudiment with its proper meaning. By carefully insisting on the use of the words vestigium and vestigial or their equivalents, for all abortive or reduced structures met with in the adult animal, and restricting the terms rudiment and rudimentary to all growing and developing tissues and organs, they could insure this result in a few years."

Ample compensation for the long delay necessitated by the change of translators and the size of the work is furnished in the additional matter in the form of foot-notes and bibliography, an addition without which a work on such a rapidly growing subject as invertebrate embryology would by this time be somewhat antiquated. Many of these foot-notes are valuable and suggestive, but others show a lack of perspective, pardonable, perhaps, in translators who cannot be expected to be familiar with all the bearings of the special matter they are rendering into English. An example of this kind is furnished by the undue importance attributed to Willey's paper on *Peripatus novæ-britanniæ*. Important this paper undoubtedly is as a description of facts, but one may doubt whether Willey's speculations to the effect that *Peripatus* was originally a viviparous form and that species like *P. oviparus* are secondarily modified in their breeding habits, would have been given so much weight by the critical German authors as to lead them to alter their

statement (p. 212) that "although the eggs of some species of *Peripatus* have little, or even no yolk, it is highly probable that they are to be traced back to eggs rich in yolk, like those of *P. novæ-zealandiæ*." Willey unfortunately involved the insect embryo in his speculations and here, too, the translators, without a vestige of critical caution, enthusiastically refer the student to the various homologies of the 'trophoblast.'

Such matters are of little importance, however, and are readily overlooked in the perusal of the flexible English rendering of the admirably lucid German text. The book is an invaluable addition to the collection of handbooks required in every zoological laboratory both in this country and in England.

WILLIAM MORTON WHEELER.

Bulletin of the United States Fish Commission, Vol. XVIII., 1898. By GEORGE M. BOWERS, Commissioner. Washington, Government Printing Office. Pp. 576. Plates 128.

The bound volume of the *Bulletin* for 1898 is the largest, and at the same time one of the most interesting, of the series of eighteen numbers which have appeared since 1881. In a prefatory note, Commissioner Bowers dwells upon the importance of the scientific work that has been carried on by those enjoying the privileges of the biological laboratory at Woods Hole, and his statement that "by affording facilities to those persons who may profit by the use of the material available at its various stations, the Commission not only aids in the general progress of science, but extends its own field of usefulness" will be heartily endorsed both by the many who have already profited by the liberality of the Commission, and by men of science generally.

The first article, beautifully illustrated, is by Commander Moser, now with Mr. Agassiz in the Pacific, and is a report on the operations of the *Albatross* during the summer, autumn, and early winter of 1897. It is a history of the 'Salmon and Salmon Fisheries of Alaska,' told in a straightforward way, and contains historical, geographical and biological data of present interest and of permanent value. Inasmuch as the output of salmon for a single year, 1897,

was about 43,600,000 cans, one does not wonder that the streams of Alaska are becoming depleted. This depletion, already serious, is caused, not by over-fishing alone, but by 'barricading,' a process whereby the fish are actually prevented from ascending the streams to spawn, and are compelled to remain practically impounded in the lower waters, awaiting the pleasure of the packers. Although barricading is punishable by heavy fine and imprisonment, the laws are not enforced, and an industry now yielding \$3,000,000 annually is threatened with ultimate extinction.

Dr. Hugh M. Smith, in charge of the scientific work of the Commission, and Mr. Barton A. Bean contribute a paper on 'The Fishes of the District of Columbia.' This and similar faunistic papers that the authors have published elsewhere have proved of great convenience to ichthyologists and local naturalists, and will be of no little assistance to students of geographical distribution. A second paper by Dr. Smith is on 'The Southern Spring Mackerel Fishery of the United States.' The paper gives an account of the history and importance of this fishery. It reviews the reasons for the prohibition of the fishery by Congress, in 1888; it gives an account of the fishery subsequent to the five years of closure, that is, since 1892; and considers certain questions that are suggested by the facts connected with this remarkable, and in many ways exceptional, action of Congress. It is to be regretted that the spring mackerel fishery, since the termination of the closed period, shows no improvement; the catches of the last seven seasons have not paid for the expense of equipping the vessels.

The article on 'The Mussel Fishery and Pearl-Button Industry of the Mississippi River,' by Dr. Smith, contains a description of the mussels used in button-making; a history of the mussel fishery, which has developed into an important industry during the present decade, nearly four thousand tons of shells having been collected by the fishermen of the Mississippi River in 1898; and a statistical review of the button industry, since the time of its establishment in Muscatine, Iowa, in 1891. The article concludes with certain timely recommendations, which, if early adopted by the States concerned, will

prevent the destruction of the industry, now threatened by improvidence and avarice.

The eighth article, by Professor C.J. Herrick, is on the 'Peripheral Nervous System of the Bony Fishes.' It is based upon a study of the silverside, and emanates from the biological laboratory of Woods Hole. Since this paper was issued in the form of a reprint, Professor Herrick's magnificent monograph has appeared in the *Journal of Comparative Neurology*.

Another contribution from the government laboratory is made by Dr. Smith, in his 'Notice of a Filefish new to the Fauna of the United States.' A second capture of this filefish (*Alutera monoceros*) was reported in a recent number of SCIENCE. A third contribution from the laboratory is by the reviewer, and is a brief history of the discovery, disappearance, and final reappearance of the tilefish.

The concluding article is by Charles H. Stevenson, on the 'Preservation of Fishery Products for Food.' It covers more than two hundred pages, is amply illustrated, and is exhaustive in its treatment. The methods of retaining, curing, preserving, storing, packing, and shipping fishery products of the most diverse nature are thoroughly discussed by one who has evidently spared no pains to make his paper of real value. H. C. BUMPUS.

BOOKS RECEIVED.

Scientific Papers. JOHN WILLIAM STRUTT, BARON RAYLEIGH. Cambridge University Press, 1899. Vol., I., 1869-1881. Pp. xiv + 562. \$5.00.

The Kinetic Theory of Gases. OSKAR EMIL MEYER, translated from the second revised edition by ROBERT E. BAYNES. London, New York and Bombay, Longmans, Green & Co. 1899. Pp. xvi + 472.

An Introduction to Physical Chemistry. JAMES WALKER. London and New York, The Macmillan Company. 1899. Pp. x + 335. \$2.50.

Outlines of Industrial Chemistry. FRANK HALL THORPE. New York and London, The Macmillan Company. 1899. New and revised edition. Pp. xvii + 541. \$3.50.

Minnesota Plant Life. CONWAY MACMILLAN. St. Paul, Minn. 1899. Pp. xxv + 568.

The World and the Individual. JOSIAH ROYCE. Gifford lectures delivered before the University of Aberdeen. New York and London, The Macmillan Company. 1900. Pp. xvi + 588. \$3.00.

SCIENTIFIC JOURNALS AND ARTICLES.

The Journal of Physical Chemistry, December, 1899. On 'Thermal and Dynamic Coefficients,' by J. E. Trevor; 'The Electrolytic Reduction of Potassium Chlorate,' by Adolph L. Voegelé. This is a quantitative study of the reduction of potassium chlorate under various considerations of density, current strength, poles of different metals, etc. Among the conclusions reached is the greater reduction in acid solutions than in alkaline, and the greater reduction with zinc poles than with those of cadmium or platinum; 'Note on the Preparation of Metallic Lithium,' by Louis Kahlenberg; metallic lithium can be obtained without difficulty by electrolyzing a solution of lithium chlorid in pyridin, without the aid of a diaphragm. A carbon anode and iron cathode are used, fourteen volts difference of potential, and 0.2 to 0.3 ampere per 100 sq. cm. of cathode area. The metal is obtained in a dense, well-adhering, silver white coating, possessing all the well-known chemical and physical properties of metallic lithium.

A JOURNAL of Petrology is planned under the auspices of a committee appointed at the last International Congress of Geology. The journal is to have the scope of a *Centralblatt*, and it is proposed that contributions may be in English, French or German. Professor F. Becke, of the University of Vienna, is Chairman of the committee, and the American members are Professor J. P. Iddings of the University of Chicago, and Professor L. V. Pirsson of Yale University.

SOCIETIES AND ACADEMIES.

WISCONSIN ACADEMY OF SCIENCES, ARTS AND LETTERS.

THE thirtieth annual meeting of the Academy was held at Madison, December 28-30, 1899. The increasing number of meetings of national societies in Christmas week detracts somewhat from the attendance of members at the meetings of the Academy, but all five sessions of the present meeting were very satisfactory. The following list of papers were given and discussed:

'A study of the lead regions of Wisconsin, Illinois, and Iowa,' by Orin G. Libby.

'Household words—their etymology,' by James D. Butler.

'A problem in longevity,' by Charles H. Chandler.

'A new geometrical and analytical solution for determining the principal axes at any point of a rigid body,' by Charles S. Slichter.

'An elementary explanation of the probability curve,' by Charles S. Slichter.

'The ice ramparts formed along the shores of lakes Mendota and Monona during the winter of 1898-99,' by Ernest R. Buckley.

'The principles controlling the deposition of ores,' by Charles R. Van Hise.

'The nepheline syenite of the Wausau district,' by Samuel Weidman.

'Chlorine in natural waters—its accurate determination and significance,' by Erastus G. Smith.

'The action of light on certain nitroso compounds,' by Oswald Schreiner.

'The sour taste of acid salts and their electrolytic dissociation,' by Louis Kahlenberg.

'The historical development of chemical symbols from the times of alchemy to the present' (illustrated by lantern slides), by Oswald Schreiner.

'The absorption of the sun's energy by water,' by Edward A. Birge.

'Some of the undeveloped natural resources of Wisconsin: clays, road materials, and marls,' by Ernest R. Buckley.

'Account of some work done on the State survey,' by Dexter P. Nicholson.

'The work of the Wisconsin Geological and Natural History Survey,' Edward A. Birge.

Two additional papers were read by title: 'The Graphite Deposits of Central Wisconsin,' by G. E. Culver; 'On the Changes of Length of Substances in an Alternating Magnetic Field,' by W. M. Jolliffe.

At the one evening session a dinner was first given by the Madison members to the visiting members followed by a few speeches, including an eloquent plea by Professor Van Hise for the breadth of knowledge which the Academy aims to encourage. The company then adjourned to another room, open to the public, where the retiring President, Professor C. Dwight Marsh, of Ripon College, gave his address: 'The Plankton of Fresh Water Lakes. It was a well-written general discussion of the minute animal and vegetable life of our lakes, with some reference to economic features, and held the close attention of the audience to the end.

The Academy has now 225 members, and

there were elected at this meeting 18 active and two corresponding members. A new board of officers also were elected, for the term of three years, including Professor C. S. Slichter, University of Wisconsin, President; Professors Harriet B. Merrill, Milwaukee-Downer College, C. H. Chandler, Ripon College, E. G. Smith, Beloit College, Vice-Presidents; Professor F. C. Sharp, Secretary; Professor L. Kahlenberg, Librarian, both of the University of Wisconsin. The library of the Academy will be installed in the fine large building provided for the State Historical Society after the dedication of the building next May.

A. S. FLINT, *Secretary*.

MADISON, WIS., Jan. 1, 1900.

THE KANSAS ACADEMY OF SCIENCE.

THE thirty-second annual meeting of the Kansas Academy of Science was held at McPherson, on December 28-29th. This Academy is a coordinate branch of the State Board of Agriculture, and as such has rooms in the State House, and its Proceedings are printed by the State. The following papers were read at the meeting:

- 'On Apocynum cannabinum,' by L. E. Sayre.
- 'The first great roof,' by Charles H. Sternberg.
- 'Geology of the Glass Mountains of Western Oklahoma,' by Mark White.
- 'Silica cement mortars,' by William Tweedale.
- 'The home of the Kansas tiger beetle,' by Warren Knaus.
- 'An apparatus for determining the relative heating power of coal and gas,' by E. H. S. Bailey.
- 'Some interesting pyrite crystals,' by J. C. Cooper.
- 'The Leonid meteors of 1833 as observed by a native Kansan,' by J. R. Mead.
- 'An example of variation in the human cranium,' by H. J. Harnly.
- 'Additions to the published flora of Kansas,' by A. S. Hitchcock.
- 'The testing of paving bricks,' by F. O. Marvin.
- 'An historical list of Kansas mammals,' by D. E. Lantz.
- 'Stratigraphy of Eastern Kansas,' by G. I. Adams.
- 'On some Diatomace of Silver Lake and vicinity,' by George H. Curtis.
- 'Analysis of a magnesium water near Madison,' by F. W. Bushong.
- 'Collecting notes from Southwest Kansas,' by Warren Knaus.
- 'Notes on a trip through Western Wyoming,' by J. R. Mead.

'Comparison of the fauna of the Permian of England and America,' by J. W. Beede.

'A geological section of Lyon and Chase counties, along the Cottonwood River,' by Alva J. Smith.

'Harmonic forms,' by B. B. Smyth.

'Ecological areas in Florida flora,' by A. S. Hitchcock.

'Some mineral deposits in Central Missouri,' by S. Z. Sharp.

'The Corona of the sun,' by E. Miller.

Address of the retiring president on 'A theory of the cosmos,' by E. B. Knerr.

E. H. S. B.

WASHINGTON CHEMICAL SOCIETY.

THE regular meeting was held on December 14, 1899.

The first paper of the evening was read by Dr. Bigelow, and was entitled 'The Determination of Metals in Canned Goods,' by W. D. Bigelow and L. S. Munson.

After an examination of a number of the methods most commonly employed, the authors gave preference to a modification of Allen's method.

The entire contents of the can are thoroughly mixed, and 75 to 100 grams taken for analysis. Often it is found preferable to dry the entire sample, extract with petroleum ether, again dry and grind, to obtain a permanent sample. In this case only 25 grams are employed in the determination of metals.

In either case the sample taken is treated with 4 cc. of strong sulfuric acid, 2 cc. of nitric acid and 3 grams of magnesia. The whole is heated on a water bath until it becomes pasty. It is then ignited over a Bunsen burner or in a muffle furnace, until thoroughly charred, ground in a mortar, again ignited to complete combustion, nitric acid being added from time to time towards the close of the operation. The residue is then boiled for a half hour in about 40 cc. of 1-3 hydrochloric acid, almost neutralized with sodium hydroxid, precipitated with hydrogen sulfid and filtered. The precipitate is dried and thoroughly mixed with one gram each of sodium carbonate, potassium carbonate and sulfur, fused for one-half hour in a covered porcelain crucible, digested in water and filtered. The insoluble portion contains copper and lead. It is dissolved in nitric acid, and divided into

two equal portions, in one of which the lead is precipitated as chromate and in the other copper is determined by titration with potassium cyanid. The filtrate from the fused sulfid is acidified with acetic acid, filtered and the precipitate thoroughly washed and transferred together with the filter paper to a solution of ferric chlorid, which is heated to the boiling point and titrated with potassium bichromate. Zinc is precipitated as sulfid in the filtrate from the original sulfid precipitate, after adding acetic acid and neutralizing the mineral acid with sodium hydroxid.

The second paper of the evening was read by Dr. Fireman and was entitled: 'The Action of Ammonium Chlorid upon Tetra- and Penta-Chlorides, Preliminary Communication,' by P. Fireman and E. G. Portner.

The last paper of the evening was read by Mr. J. D. Tinsley and was entitled, 'On the Estimation of the Water Soluble Constituents of Soils,' by J. D. Tinsley and F. K. Cameron.

Dr. Seaman spoke on the size of medicine droppers found in the market. He had found them variable, giving drops of different sizes. He showed that the size of the drop depends on the external diameter of the orifice and not on the thickness of the walls.

WM. H. KRUG,
Secretary.

DISCUSSION AND CORRESPONDENCE.

PREVENTION OF HAIL.

BUT little notice has been taken in the United States of the remarkable progress made in northern Italy in the establishment of stations for the protection against injury from hailstorms, by means of the *Wetterschiessen*—one of the old 'superstitions' which has come to honor again in our enlightened age. Shooting and ringing of church bells has for ages been popularly supposed to be efficacious against the effects of thunder-storms, especially of lightning. But the belief found no scientific support, and statistics seemed to prove that the rains supposed to follow the heavy cannonading of great battles are, like the weather changes following those of the moon, quite as much the exception as the rule. Now, however, the matter has taken the

practical shape, in the form of stations located at intervals of not more than a kilometer apart in regions subject to hailstorms, and provided with a small cannon placed vertically and surmounted by a six-foot, narrow-conical trumpet, which transmits the vortex and concussion of a 2-3 ounce charge of black powder to the threatening cloud, preventing the formation of hail, and apparently also diminishing the electrical discharges. The idea originated with Burgomeister Moritz Stigel, of Styria, where after three years' experience complete exemption from hail-injury seems to have been secured, so that the inhabitants have abandoned hail insurance, finding the new method cheaper.

In the last semi-annual volume of Proceedings of the Academy of Georgifili, Florence, the subject is once more extensively discussed. A new style of breech-loading rapid-fire gun has been substituted for the original Stigel pattern, and 800 of these anti-hail stations have been and are being established in the region of Brescia, for the protection of vineyards. Small bombs with time fuses have been added to the equipment, and it is stated that the vortex, outlined by means of the dust, reaches the height of two kilometers, and that its low, whistling noise is heard from fourteen to seventeen seconds after the discharge.

E. W. HILGARD.

ELECTRICAL ANÆSTHESIA.

EDITOR OF SCIENCE: My attention has been called to an account in a New York paper of the method of producing anæsthesia by electricity, now being tried experimentally in the Yale Psychological Laboratory. Permit me to say that this account was entirely unauthorized. The demonstration of what had been accomplished was made informally at the recent meeting in New Haven of Section H of the American Association for the Advancement of Science, and no permission was given for any publication of the results. The last authorized statement in regard to the matter appeared in SCIENCE for March 10, 1899; unless there is some reason for the contrary, all future statements will appear first in the columns of SCIENCE.

E. W. SCRIPTURE.

NOTES ON INORGANIC CHEMISTRY.

IN a recent number of the *Journal für Gasbeleuchtung* an account by M. van Breukeleveen and A. ter Horst is given, taken from *Het Gas*, of serious trouble from the formation of iron-carbonyl in water-gas mains. This Dutch works manufactures uncarburetted water-gas for use in Welsbach burners, and it is found that in a short time the mantel of the burner loses all its brilliancy owing to the deposition of a brown substance, which micro-chemical analysis proved to be iron. This proved to have been deposited from the iron-carbonyl formed, not in the process of manufacture of water-gas, but in its passage through the cold iron pipes, at ordinary pressure. The only practical remedy seems to be coating the interior of the pipes with tar. A similar deposit is often noticed on the lines used in the Drummond light, where instead of hydrogen, compressed water-gas or even coal gas in steel or wrought iron cylinder is used. Here the only remedy for the diminishing of the light consists in turning the lime quite often.

IN the following number of the *Journal Broockmann* takes up the old problem of the gases contained in bituminous coal. At 100° E. von Meyer found a maximum of 238 cubic centimeters gas given off from 100 grams of coal, while Bedson found as high as 818 cc. The great variation in quantity as well as in composition is ascribed, in part at least, by Broockmann to the presence of more or less atmospheric air. He himself worked with a Sprengel vacuum which was kept with repeated warming for three days before the coal was heated, a temperature of 100° then being used. In this way a number of Westfalian coals gave from 7 to 150 cubic centimeters per hundred grams, an English coal 70 cc., a lignite from Habichtswald 50 cc. The gases obtained were generally chiefly methane with more or less carbon dioxide. Higher hydrocarbons, carbon monoxid, and oxygen were rarely present and then only in small quantities. One of the Westfalian coals gave little methane, more carbon dioxide, and over 60 per cent. of nitrogen. Two Oberschlesian coals gave a mixture of carbon dioxide and nitrogen, and the lignite gave 91 per cent.

carbon dioxide and nine per cent. carbon monoxid. When heated with air in a closed tube to 160°–200° the oxygen of the air is completely absorbed, leaving only nitrogen with a very little carbon dioxide.

THE precipitation of gold by iron pyrites is investigated by P. V. Gladkov in the *Berg- und Hüttenmannische Zeitung*. A solution of gold chlorid is completely precipitated by filtering through a layer of pyrites; if the pyrites carry copper, this and not iron replaces the gold in solution. The reduction takes place in pyrites which have been carefully washed by acid and hence is caused by the sulfid and not by any ferrous sulfate which might have been formed by weathering. The gold is precipitated not as sulfid, but as metallic gold, as is shown by the fact that it can be amalgamated with mercury. This study has considerable bearing on the treatment of pyrite ores of gold.

J. L. H.

CURRENT NOTES ON PHYSIOGRAPHY.

THE CHATTANOOGA DISTRICT.

THE 'Physiography of the Chattanooga district, in Tennessee, Georgia and Alabama' is elaborately discussed by C. W. Hayes (19 Ann. Rep., U. S. G. S., Pt. II., 1–54, 5 colored maps). The mountains of post-Carboniferous deformation were reduced in Cretaceous time to a broad peneplain (the Cumberland) with scattered or grouped monadnocks; 'unakas' being suggested as a name for grouped residuals. General uplift of the region allowed the development a less extensive peneplain (the Highland-Rim) probably in Eocene time; and a still later uplift permitted the excavation of the present valley floors in Neocene time. The peneplains are referred to subaerial instead of to marine denudation, after a critical review of their origin. Special consideration is given the development and adjustments of the drainage system; the chief streams first flowed westward into an interior sea; then southward along the troughs of Appalachian deformation; then westward again as a result of the shifting of divides by stream action chiefly in the first and second cycles of gradation. It is pointed out that the Tennessee may in the future be once more turned southward

by the headward growth of the Coosa. Ridges of hard strata, produced by the dissection of an uplifted peneplain of monoclinical structure, are believed to retain their even crests while reduced toward the new baselevel, and hence should not alone be taken as indicating a peneplain. Differences of structure are recognized as controlling many local drainage adjustments, but broader modifications of drainage are believed to result from "the slight warping of the land service which appears to accompany all uplifts."

RIVER SPACING AND REGIONAL BEVELING.

A WELCOME continuation of the discussion on peneplanation begun by Tarr (*Amer. Geol.*, June, 1898) is found in articles by Shaler (Spacing of rivers with reference to hypothesis of baseleveling. *Bull. Geol. Soc. Amer.*, X., 1899, 263-276) and Tangier Smith (Some aspects of erosion in relation to the theory of the peneplain, *Univ. Cal., Bull. Dept. Geol.*, II., 1899 155-178). The first article suggests that the often observed approach to uniformity of interval between adjacent valleys, and to uniformity in the slope of valley sides "tends to bring about a likeness in the height of the divides even where the original surface was of varied elevation"; and the so-called peneplains of the Appalachian region (such as those of the Chattanooga district, referred to above) are thought to be better accounted for in this way than by baseleveling; but the best preserved peneplain of this region, that of the Piedmont belt, is regarded as beyond explanation by river and atmospheric action, and is therefore by implication referred to a marine origin.

The second article deals more elaborately with the development of graded valley sides and with the correlations of summit height, side slope, and stream action in regions of mature dissection. The roughly equal spacing of the principal rivers of a topographic unit is said to 'follow as a necessary corollary' from the general principles thus deduced. Regions exhibiting a general uniformity of summit height, but so maturely dissected as no longer to preserve remnants of their initial uplands, are regarded as more probably explained by stream spacing and hill grading in the present cycle,

than by peneplanation in a former cycle. The beveling of a region by the more rapid degradation of the hills near the coast than in the interior, as previously suggested by Tarr and here more fully stated, is held to give sufficient explanation of facts that have been referred by others to the unequal uplift or tilting of a peneplain. On the other hand, uplands that consist of truncated hills of accordant height, capped with residual soils and bearing old river gravels, are regarded as true uplifted peneplains.

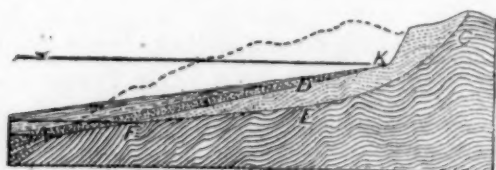
As to beveling *versus* tilting, truly the degradation of hills must be a little faster near the coast than in the interior, but the excess does not account for the slanting descent of the New England upland southward to the shore of Long Island sound, or for the gradual decrease in height of the Cumberland peneplain from Tennessee into Alabama.

AN ANCIENT PLAIN IN COLORADO.

W. O. CROSBY gives a detailed account of the remarkably smooth floor of crystalline rocks on which the Cambrian sandstones rest in the Rocky Mountain front range in Colorado. Although now tilted and more or less deformed, the floor is described as originally of very faint relief, with residual eminences only three or four feet high over areas of many square miles; but it may be noted that broad swells and troughs are not excluded by any direct evidence. Comparing this with other smooth sub-Cambrian floors in the United States, Crosby concludes that they are all parts of an extensive surface of planation (abrasion), produced during a period of slow subsidence, by marine attack on a region that "may very well have been reduced to a peneplain by prior subaerial erosion" (*Bull. Geol. Soc. Amer.* X., 1899, 141-164).

The occurrence of marine strata on a floor of firm, unweathered rock certainly points to marine abrasion before deposition began, but it may be urged that the prevailing absence of valleys in the even sub-Cambrian floor suggests the change of 'may very well have been' to 'must have been' in the preceding quotation. The broad floor was in any case the result of the destruction of an extensive pre-Cambrian

highland or mountain region, for its rocks are of deformed structure or of deep-seated habit over large areas. During the long period of combined sub-aerial and marine attack upon the highland, large rivers must have cut down deep valleys, while sea waves abraded a plane around its litoral margin; that is, the valley, *CEF*, would have been eroded, while the marginal plane, *AF*, was abraded. In the time needed to give *AF* a breadth of several miles, the main valley, *EF*, would be reduced to very



gentle slope. Under the supposition that the surface attacked by the encroaching sea was of such a relief that a considerable subsidence might occur during its submergence, the valley, *FE*, would in time be buried by the sediments, *ADK*. No buried valleys are known in the even sub-Cambrian floor. Their absence can be explained only under the supposition that the sea abraded the land to a greater depth than the valleys had been cut in it, and hence that but moderate subsidence occurred during abrasion. Under this limiting condition, extensive peneplanation must have occurred before great marine encroachment by abrasion could have been accomplished.

THE URAL MOUNTAINS.

THE excursion of the International Geological Congress to the Ural Mountains in 1897 gave Dr. F. P. Gulliver opportunity for reaching the following conclusions regarding the evolution of their existing form. A long period of sub-aerial planation, probably aided by marginal marine action, reduced the region to a lowland surmounted by a few monadnocks. The lowland was then arched by successive uplifts, the axes of greatest elevation being east of the middle of the range; and benched valleys were eroded beneath the general upland level.

Approaching the range from the west, there is a gradual transition from the great Russian planes of nearly horizontal structure to the dissected peneplain of deformed structures. Ap-

proaching from the east, a part of the old mountain peneplain remains at moderate altitude adjoining the Siberian Tertiary plains; unexplained lakes occur in this part of the peneplain, which is generally separated from the revived mountains on the west by an abrupt ascent, thought to be a weathered fault scarp (*Bull. Geol. Soc. Amer.*, X., 1899, 69-82).

W. M. DAVIS.

NOTES ON TERRESTRIAL MAGNETISM.*

CAPTAIN DENHOLM FRASER, R.E., is at present engaged in making the necessary arrangements for inaugurating a magnetic survey of India and Burma.

CAPTAIN LYONS, R.E., in charge of Geological Survey of Egypt, has for some years been making magnetic observations during his journeys in various parts of Egypt. It is hoped that before long a systematic magnetic survey of Egypt can be undertaken.

Two proposed sites for the Standard Magnetic Observatory in the vicinity of Washington have been examined during the past month by magnetic parties under Dr. Bauer's direction, in order to determine the most suitable place. One of these sites, situated twenty-two miles to the northwest of Washington, has revealed pronounced magnetic anomalies, while the other site, sixteen miles to the southeast of Washington, has thus far shown no abnormal values. The latter site appears to be also a favorable one as far as freedom from electric tramway influence is concerned.

THERE are at present four observatories at mining stations in Germany, at which the variations of the magnetic declination are being continuously recorded by photographic means, viz.:

1. Clausthal, Harz. This observatory has been in existence since the days of Gauss. It is provided with a Gaussian declinometer for eye-readings, and a more modern instrument for self-registering purposes. Copies of the daily records can be had upon application.
2. Beuthen, Upper Silesia.
3. Bochum, Westphalia.
4. Hermsdorf, bei Waldenburg.

The last three-named stations were started at

* From advanced sheets of *Terrestrial Magnetism*.

the suggestion of Professor Eschanhagen. They publish their declination traces regularly in the interests of the mining engineers.

WHILE residing in Cincinnati, Dr. Baur made magnetic observations about 100 meters west of an electric tramway (double trolley overhead system) running north and south. During the passage of a car, the declination needle was deflected $1'-2'$.

DR. L. A. BAUER returned to Washington on December 18th, having compared a set of the United States Coast and Geodetic Survey instruments with the standard instruments at the following observatories, viz.: Kew (before and after visiting the succeeding observatories), Potsdam, Pawlousk, and Parc St. Maur. He has also compared his dip circle with three earth-inductors of different construction. At Potsdam (Leonard Weter's inductor), at Pawlousk (Wild's portable inductor), and at Darmstadt (Karl Shering's inductor). The results will be published as soon as the various instruments of the Coast and Geodetic Survey have been intercompared, and when the comparisons at the Toronto Observatory have been made. Owing to the limited time at Dr. Bauer's disposal, it was necessary for him to restrict himself to the above-named observatories.

PROFESSOR E. LEYST, director of the Physico-Geographical Institute of the University of Moscow, includes in his department a systematic course on the theory and practice of measurements in terrestrial magnetism. His students are obliged to determine the magnetic elements, and to set up and operate a set of variation instruments and to determine the constants. The new institute, which will be a model building of its kind, is rapidly approaching completion. Professor Leyst has provided in this building for the installation of a set of variation instruments. The accompanying absolute observations will be made at a point outside of Moscow, far removed from any disturbing influence.

SCIENTIFIC NOTES AND NEWS.

THE CONGRESS OF AMERICAN PHYSICIANS AND SURGEONS.

THE fifth Congress of American Physicians and Surgeons will be held at Washington on

May 1st, 2d and 3rd, under the presidency of Professor Henry P. Bowditch. The following fourteen societies join in the triennial Congress:

- The American Neurological Association.
- The American Gynecological Society.
- The American Dermatological Association.
- The American Laryngological Association.
- The American Surgical Association.
- The American Climatological Association.
- The Association of American Physicians.
- The American Association of Genito-Urinary Surgeons.
- The American Orthopedic Association.
- The American Physiological Society.
- The Association of American Anatomists.
- The American Pediatric Society.
- The American Ophthalmological Society.
- The American Otological Society.

There will be two general sessions of the Congress. The subject at the first of these to be held on Tuesday afternoon, will be 'Bacteriology in Health and Disease,' and papers will be presented by Professor Theobald Smith, Dr. S. J. Meltzer, Professor Harold C. Ernst, Dr. Richard C. Cabot, Dr. Edward R. Baldwin, Professor William S. Thayer, Professor George Dock and Professor Simon Flexner. At the second session, on Wednesday afternoon, the program will be as follows:

'On Modern Therapeutics,' by Prof. William Osler, M.D., LL.D., of Baltimore, Md.

Essay, 'Sociological Status of the Physician,' by Dr. Clarence J. Blake, of Boston, Mass.

Poem 'The Evolution of the Physician,' by Dr. S. Weir Mitchell, M.D., LL.D., of Philadelphia, Pa.

Professor Bowditch will give his address as president on Wednesday evening, the subject being, 'The Medical School of the Future.' This will be followed by a reception and there will be a banquet on Thursday evening. The separate societies will hold their meetings on Tuesday and Wednesday mornings and on Thursday.

The Secretary of the Congress is Dr. W. H. Carmalt, New Haven, Conn.

THE SOCIETY OF AMERICAN BACTERIOLOGISTS.

At the New Haven meeting of the American Naturalists during the Christmas holidays, a number of the leading bacteriologists of the

country met, as previously announced in this JOURNAL, for the purpose of forming a society of bacteriologists. As a result of the meeting there was organized a society which is the first in the country, and probably the first in the world, organized for the distinct purpose of studying and discussing bacteriological problems. The society will in general meet with the American Naturalists. The opening meeting was very auspicious, there being over thirty in attendance. The persons joining in the organization of the society included bacteriologists whose lines of study cover a wide range of subjects. Among them were those devoted to the study of pathology; others studying hygiene. Others again are engaged in the investigation of agricultural topics and yet others interested in the industrial problems of bacteriology. Some papers were also presented upon purely biological aspects of bacteria. The wide range of branches represented indicates the extent to which bacteriology has extended in the short years of its existence as a branch of science, and plainly points out the need of some organization to centralize the work and bring to a common point information of mutual interest.

In addition to the work of organization a program of papers was presented. A more complete account of these papers will appear in a later issue of this JOURNAL.

The society elected the following officers for the coming year:

President, Professor W. T. Sedgwick, Mass. Institute of Technology; *Vice-President*, Professor A. C. Abbott, University of Pennsylvania; *Secretary* and *Treasurer*, Professor H. W. Conn, Wesleyan University; *Council*, Professor Theobald Smith, Professor Harold Ernst, Professor E. O. Jordan and Dr. E. A. de Schweinitz.

Bacteriologists desiring information concerning the society may apply to the secretary, Professor H. W. Conn, Middletown, Connecticut.

WASHINGTON ACADEMY OF SCIENCES.

THE by-laws of the Academy were modified in May of last year by providing for a class of non-resident members. A committee representing each branch of science was appointed to consider the eligibility of men of science throughout the country for non-resident mem-

bership, and about one hundred members of this class have been elected. It is intended that the Washington Academy of Sciences shall become national in character, in so far as this does not conflict with the field of the National Academy of Sciences, and the American Association for the Advancement of Science. In view of the large number of men of science engaged in the work of the scientific bureaus of the Government and the frequent meetings of scientific societies at Washington, the City has especial claims to be regarded as the chief scientific center of America, and arrangements are contemplated for an annual scientific meeting under the auspices of the Washington Academy, which will be practically a congress of all the scientific men of the country.

At its annual meeting held January 17th, the Academy elected the following officers:

President, Hon. Chas. D. Walcott; *Vice-Presidents*, from the Anthropological Society, W. J. McGee; from the Biological Society, F. V. Coville; from the Chemical Society, Dr. H. N. Stokes; from the Columbia Historical Society, Hon. John A. Kasson; from the Entomological Society, Dr. Theo. N. Gill; from the Geological Society, G. K. Gilbert; from the Medical Society, Dr. S. C. Busey; from the National Geographic Society, Alexander Graham Bell; from the Philosophical Society, Dr. Geo. M. Sternberg; *Secretary*, Dr. Frank Baker; *Treasurer*, Bernard R. Green; *Managers, Class of 1903*, F. W. Clarke, Dr. C. Hart Merriam, Whitman Cross.

GENERAL.

THE Geological Society of Great Britain will this year award its medals and funds as follows: The Wollaston Medal to Dr. G. K. Gilbert, of Washington; the Murchison Medal to Baron A. E. Nordenskiöld, of Stockholm; the Lyell Medal to Dr. J. E. Marr, of Cambridge; the Wollaston Fund to Mr. G. T. Prior; the Murchison Fund to Mr. A. Vaughan Jennings; the Lyell Fund to Miss G. L. Elles; and the Barlow-Jameson Fund to Mr. G. C. Crick and Professor T. T. Groom.

MR. PERCIVAL LOWELL of Boston, and Professor D. P. Todd of Amherst College, sailed for Europe on January 17th, and will proceed to North Africa to arrange for observations on the total eclipse of the sun occurring on May 28th. Mr. Lowell's telescope and camera are

probably the best instruments hitherto used in such observations. Mr. A. E. Douglass will make simultaneous observations under Mr. Lowell's auspices in Georgia.

PRESIDENT DANIEL C. GILMAN has been granted a year's leave of absence by the trustees of the Johns Hopkins University. He will leave for Europe early in the spring.

PROFESSOR REGINALD A. FESSENDEN, of the electrical engineering department of the Western University of Pennsylvania, has resigned his chair to accept a position in the Signal Department of the United States Weather Bureau, at Washington.

THE Academy of Sciences at Belgium has elected as foreign members, Sir George Stokes, Sir John Murray, M. Moissan, M. Maupas and President Jordan.

THE Royal Astronomical Society of London has elected as foreign members, Professor George E. Hale, of Yerkes Observatory; Professor Robert Helmert, of Berlin University; Professor K. F. Küstner, of the Bonn Observatory; and Dr. Juan M. Thome, of the Argentine National Observatory.

DR. MANUEL ANTON, professor of anthropology at the University of Madrid and secretary of the Museum of Natural Sciences, has been appointed acting director to fill the vacancy caused by the death of Dr. Andres.

It is gratifying to learn that the manuscript of the new edition of Coues' 'Key to North American Birds,' which has been largely rewritten and rearranged in conformity with the classification and nomenclature of the American Ornithologists' Union, was left by Dr. Coues in a finished condition, and will be published as soon as the new drawings, which are being made by Louis Agassiz Fuertes, are ready.

DR. JAMES MARTINEAU died in London on December 12th, in his ninety-fifth year. He began the study of civil engineering, but soon turned to theology and philosophy, and was appointed professor of philosophy in Manchester New College in 1840. He followed the College to London in 1857, and became its Principal in 1869. Dr. Martineau is well-known

for his writings on theology and philosophy, of which one of the most important is 'Types of Ethical Theory,' published in 1885.

DR. WILLIAM A. HAMMOND died at Washington on January 5th. He was at one time Surgeon General of the United States and later Professor of Diseases of the Mind in Bellevue Medical College, New York.

THE *Auk* announces the death of two members of the Ornithologists' Union. Dr. D. Webster Prentiss, one of the founders, but since 1895 a corresponding member, died in Washington on November 19th. He was best known for his contributions to medicine, but published in conjunction with Dr. Coues a list of birds ascertained to inhabit the District of Columbia. Mr. W. W. Colburn, an associate member of the Union died in Springfield on October 17th last. He had been principal of the high schools at Manchester and Springfield, and did much to promote the study of natural history. He had published, in conjunction with Mr. R. O. Morris, a list of 203 species of wild birds observed in Forest Park, Springfield, Mass.

WE regret also to record the death on January 14th of Mr. W. T. Suffolk, treasurer of the Royal Microscopical Society of Great Britain.

MR. ANDREW CARNEGIE has given \$50,000 for a library in East Orange, on condition that a site be provided and \$5,000 contributed annually for its support. A similar offer has been made to the City of York, Pa., and \$40,000 has been offered to the City of Covington, Ky., on the same conditions.

MR. M. L. DELAFIELD, Jr., of New York City, has qualified as the first patron of the Botanical Society of America by giving \$250 to the Society.

A BILL has been introduced in the Assembly at Albany appropriating \$30,000 to allow the State Engineer and Surveyor to continue to cooperate with the Director of the United States Geological Survey in making a topographic survey and map of the State of New York.

By direction of the secretary of war, a board of medical officers, to consist of First Lieutenant Jere B. Clayton, assistant surgeon, U. S. A.; First Lieutenant, Richard P. Strong, assistant surgeon, U. S. A., and Acting Assistant Sur-

geon, Joseph J. Curry, U. S. A., has been appointed to meet at one of the general hospitals in or near Manila, for the purpose of studying tropical diseases in the Philippine Islands.

DR. E. R. HODGE, pathologist at the United States Army Medical Museum, Washington, D.C., has left for Manila for the purpose of securing for that institution such pathological specimens as may result from active hostilities and the occupation of a tropical country.

WE learn from the *Botanical Gazette* that the city of Philadelphia has acquired the dwelling and part of the grounds which belonged to James Logan (1674-1751), with Penn one of the founders of Pennsylvania, and a botanist of note, after whom *Logania*, the type of the *Loganiaceæ*, was named by Robert Brown. The property will be known as Stenton Park, the original name of the Logan estate, as there is already a Logan Square in the city.

PLANS have now been submitted for the new building of the American Geographical Society, New York City, to be erected on West 81st street, opposite the American Museum of Natural History. The estimated cost of the building is \$100,000. The façades will be of brick, granite, and terra cotta. An ornamental balcony of carved stone will have a place over the central entrance, with pilasters on either side. Two lamp-posts supporting globes will be put up at the entrance. Beneath the top tier of windows will be blocks of stone with the names of Columbus, Marco Polo, and Magellan. The first floor will contain the lecture hall, while the library will take up the second story.

AT the first meeting of the Paris Academy of Medicine for the present year, the prizes to be awarded in 1900, 1901 and 1902 were announced. The prizes for the present year number 36, and vary in value from 300 to 6000 francs. They are, with a few exceptions, open to foreigners, but the manuscripts or printed works must be written in French or Latin. They must be presented not later than February 1st of each year.

THE fiftieth anniversary of the foundation of the Paris Society of Biology was celebrated on December 24th. As part of the ceremonies, a commemorative tablet in honor of Claude

Bernard, one of the founders of the Society and its second president, was unveiled in his old laboratory in the Collège de France. An address in honor of Bernard was made by M. d'Arsonval, his successor in the chair of medicine. Addresses commemorating the anniversary of the Society were made by the President, Professor Bouchard, and by the General Secretary, M. Gley. M. Leygues, the minister of public instruction, named as officers of the legion of honor, Professor Mathias Duval, M. Gréhaut, the chemist, and M. Capitan, secretary of the Society.

UNIVERSITY AND EDUCATIONAL NEWS.

A MEMORIAL has been presented to the Maryland House of Representatives asking for a continuation of the appropriation of \$50,000 per annum for the Johns Hopkins University.

PRESIDENT TUCKER, speaking before the Dartmouth Alumni Association of Boston, is reported to have said, that during the year six professors, six assistant professors and three instructors had been added to the faculty of Dartmouth College, and that the number of students had been increased by 50. The Wilder physical laboratory completed during the year was said to be the best equipped in New England. Gifts amounting to \$150,000 had been received during the year in addition to \$300,000 given by Amos Tuck. President Tucker wishes to collect \$1,000,000 to celebrate the 100th anniversary of the graduation of Daniel Webster from Dartmouth College.

A COMMITTEE has been appointed to enquire into the question of establishing a university college for North Staffordshire, England, and report in favor of trying to collect £20,000 for a building.

It is reported that President Ayres of the University of Cincinnati will recommend the discharge of the entire faculty of that institution at the end of the present college year, as a remedy for the troubles that have existed for a long time.

PROFESSOR F. A. C. PERRINE has resigned from the chair of electrical engineering in Stanford University.